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ON THE POSITION OF THE LESSER HORSE-SHOE
BAT, *RHINOLPHUS HIPPOSIDEROS*, BECHSTEIN,
DURING HIBERNATION.

BY R. NEWSTEAD, F.E.S.,
Curator of the Grosvenor Museum, Chester.

(PLATE II.)

As I do not remember to have seen any figures illustrating the position of this strange little mammal when asleep or hibernating, the thought occurred to me that the readers of 'The Zoologist' would be interested in the accompanying photographs, taken from life, which admirably represent *Rhinolphus hipposideros* in its most characteristic form.

In the celebrated Cefn and Tremeirchion caves this bat is fairly common—more so in the former than the latter. But the little cave-dweller may very probably occur in any suitable habitat throughout the district. My first acquaintance with the species was through Mr. Brockton Tomlin, who brought a specimen to our Museum for identification.

On March 4th, 1896, Messrs. Coward and Oldham joined me in an expedition to the caves; and on April 12th of the present year I paid a second visit to Cefn. The examples met with were easily accessible, and one of them was photographed *in situ*; but the strong light from the magnesium ribbon put the little creature in a nervous state of apprehension, and the resulting picture was

not good, so I was obliged to resort to more favourable conditions in order to obtain the result here portrayed. On both occasions the bats were hibernating, but awoke on the slightest provocation; and when removed from the cave became very active and readily took to wing. On April 12th, at 1.30 p.m., the temperature of the Cefn cave, about twenty yards from the entrance, was 9° C., just 1.25° C. colder than the shade temperature outside.

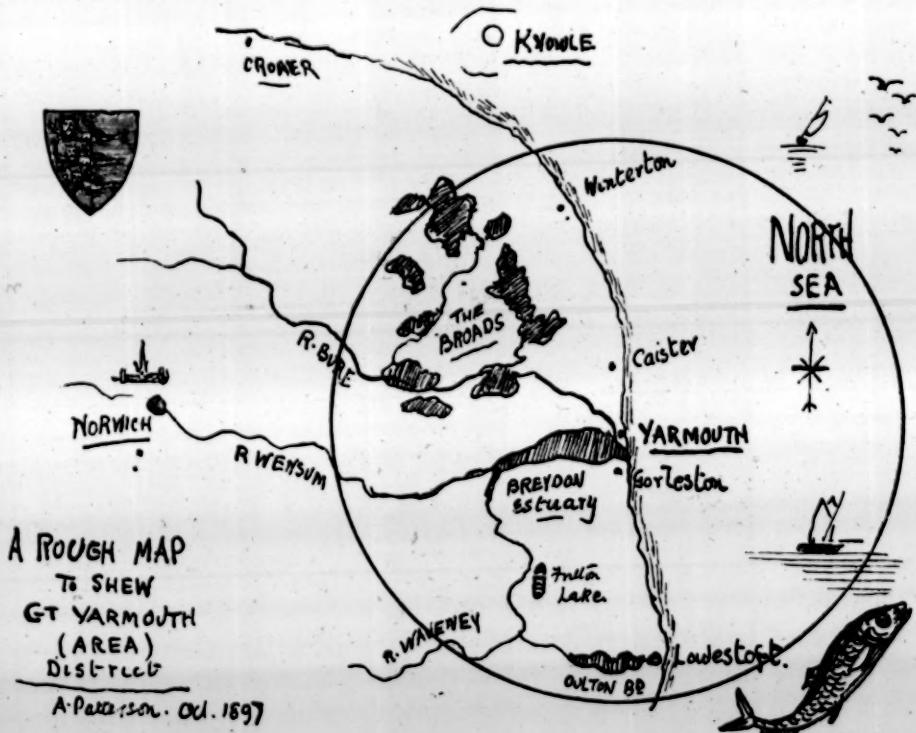
I placed my captives in a well-ventilated cage in a suitable atmosphere, but the frail little creatures died in a few days. When sleeping they cling most tenaciously to the rock, and the feet are placed somewhat closely together, rarely are they widely separated; but I noticed one example hanging for a long time with its legs completely crossed. With the exception of the upper portion of the head with the tips of the ears and a narrow dorsal space, the animal is completely enshrouded in its wings. Sometimes the head is also covered, but the space between the fore arms is always exposed. The fingers bend suddenly inwards at the joints, and all meet on the ventral parts of the body, where they, together with the membrane, form an irregular pentagon. The anomalous position of the tail is noteworthy; it is reflexed over the back with its accompanying membrane closely overlapping the wrinkled membrane of the legs, thus forming a deep narrow trough: an excellent apparatus to carry off any drops of water that might fall upon it from the roof of its habitat. Viewed in profile, the animal bears a remarkable resemblance to the pupa of a butterfly, and is altogether a most interesting little creature to study.

An examination of their rejectamenta showed that they had been feeding, almost exclusively, upon the smaller species of Lepidoptera; there were fragments of other insects, but I failed to ascertain the order to which they belonged. A great deal remains to be done with the structural details of this species, but other pressing matters prevent my adding further to this communication.

THE MARINE AND FRESH-WATER FISHES OF GREAT YARMOUTH AND ITS NEIGHBOURING COASTS, RIVERS, AND BROADS.

By ARTHUR PATTERSON,
Author of 'Man and Nature on the Broads,' &c.

NOTWITHSTANDING that Great Yarmouth, like Amsterdam, may be said to be built on herring-bones—in other words, owes



its existence and erstwhile importance to the great North Sea Herring Fishery—ichthyology, apart from those species which have a pecuniary interest for Yarmouthians, has never been a favourite nor a prominent study. Certainly a transient interest was evinced at one time, when the Aquarium (now a theatre) began its brief existence, and when Fishery Exhibitions were a novelty; and also when the late Frank Buckland stirred some to

observe and to gather together interesting facts in relation to local marine fishes; but beyond that, and the compilation of one or two lists, little systematic recording of rare species, and of the economy and changes of fish-life, has been done.

The fresh-water species have been fairly well attended to, their habits and habitats being alike known to anglers, river poachers, and others: the first are ever-increasing in number, and angling clubs in the neighbourhood are legion; the second, thanks to the energies of the Yare and Bure Preservation Society, have had their day, or nearly so; and if the Yarmouth district angling fraternity would give greater support, pecuniary and otherwise, to the Society, poaching would become an unknown quantity. Tons of fresh-water fishes have from time to time been netted—somewhat audaciously too—yet the rivers and broads still fairly abound in certain species. The owners and tenants of the Broadlands have found it to their interest to see that the races of coarse fish have not been unduly depleted.

New fresh-water species have not been, except in one or two instances, introduced, and these were failures. Notably a consignment of Trout, *Salmo fario*, turned into the Filby Broad (where they had access to the Ormesby and Rollesby Broads), and the Black Basse, *Centropristes atrarius*. A few of the former attained some size, almost the last survivor being hooked in 1896; and anglers were glad to be rid of the latter voracious species. Neither increased their numbers, and both are now virtually extinct.

The Norfolk coast-line is a favourite rendezvous for certain migratory species, Herrings to wit; the bays and shallows of the Norfolk Estuary (the Wash) form a very suitable breeding ground for many species, but the seaboard in the more immediate neighbourhood of Great Yarmouth is not, in my estimation, favourable to the habits of a great majority, the flat, sandy, shifting nature of the bottom affording but little shelter, although in the finer months it abounds in Crustacea and Entomostraca. The abundance of Crustacea may be imagined when some eighty Shrimp-boats, carrying a man and boy or two men each, working dredges, and in some cases small trawls with a beam of from twelve to fourteen feet, find their owners remunerative employment from March to end of September. Their catches are principally the *Aesop's Prawn*, *Pandalus annulicornis* (known locally as

the "Pink Shrimp"), and the Sand Shrimp, *Crangon vulgaris* (known as the "Brown Shrimp"). Two bushels of Shrimps are a no uncommon "take" in a single tide. "Browns" come inshore in the spring, and are then chiefly taken; the "Reds" arriving during the warmer months; after which the "Browns" are sought again. Following these crustaceans are a hungry horde of Pogges, Weavers, Sea-bullheads, and others, amongst them being occasionally discovered rare and interesting species. The Opossum Shrimp, *Mysis chameleοn*, abounds, myriads of these semi-transparent creatures sometimes speckling a "square fathom" of salt-water. This species is the prey of many fishes, from Gobies up to large Flounders. From the shrimpers' refuse I have secured very interesting strangers, and I am of opinion that if our shrimpers would take the pains to preserve rare finds, many more species might yet be added to the county list.

This leads to my methods of finding rarities. For some three or four years I kept on good terms with the Shrimp-lads, who for a consideration brought me uncommon "finds." These lads have since grown up, and are now mostly in the Navy. Scarcely any boys are employed at the present time. I have patrolled the beach many hundred times, often before daylight, in hope of discovering new fishes amongst the refuse left by the "draw"-netters. And I have persuaded wharf-men, fish-salessmen, and keepers of fish-shops to save for me, until I could inspect, anything of a rare or curious nature. By so doing I have obtained the White and the Two-spotted Gobies from the Shrimp-lads, the Four-bearded Rockling and the Müller's Scopelus on the sands, and the Streaked Gurnard and Ray's Bream from the wharf and fish-shop.

The principal fishing craft of Great Yarmouth are as follows:—Trawler, carrying an immense trawl-net; wolder, a small trawler going out but thirty or forty miles; the lugger, carrying a fleet of drift-nets (sometimes reaching considerably over a mile in length when "shot"—this is for Herrings);—a few solitary boats carrying nets for Mackerel; and the Shrimp-boat, as before mentioned. Added to these, two or three boats proceed to sea "long-lining" for deep-sea fish, e.g. Skate, Cod, Conger, and so on. The June Mackerel fishery has become obsolete, the great early summer Mackerel shoals having forsaken their once local resorts.

Previous to 1876 the immediate waters teemed with many species of fish which now come only at intervals, and in far less numbers. There can be little doubt that prior to that time, when the Herrings were all landed on the beach, the fishes gathered to feast upon the tons of refuse that from time to time was necessarily thrown overboard. Now that the Herrings are landed two miles up-river, and even the garbage has a monetary value, there is nothing to attract them hither. The same remark applies to such birds as rare Gulls, Skuas, and Petrels, which are no longer commonly seen with us.* At that time seine-netting (local, "drawing") afforded remunerative employment, boat-loads of Cod, Codlings, Whitings, Gurnards, and others being taken. Drawing is now carried on in a half-hearted, desultory fashion by a few odd boats in the early summer, just prior to the invasion of the visitors, Salmon-trout being the favourite quest.

The first list of Yarmouth fishes was published by Charles and James (now Sir James) Paget in their 'Sketch of the Natural History of Great Yarmouth'; it enumerates eighty-one species, but so accurate has it been found that I have been compelled to eliminate only two species—the Sordid Dragonet, *Callionymus dracunculus*, and the Toothed Gilthead, *Sparus niger*; the former, as is now well known, being either the immature or the female of *Callionymus lyra*, known at one time as the Gemmeous Dragonet. Dr. Lowe has since published, in the 'Transactions' for 1872-73 of the Norfolk and Norwich Naturalists' Society, a "List of Norfolk Fishes," with a supplemental list, which appeared in the 'Transactions' for 1893-94 (pp. 634-42).

In the year 1887 I resolved to confirm the Pagets' existing list of Yarmouth Fishes, with the result of not only deducting the above-named species, but nearly doubling it in the ten years which have since elapsed, including several new to the county. These will be noted later on. My own published notes are as follow:—

- (1) "List of Yarmouth Fishes," in 'Fish-Hook and Float,' 1888.
- (2) 'A List of the Fishes of the Great Yarmouth District,' under *nom de plume* of "Luberta." 1892.
- (3) "Notes" on rare and interesting species and varieties, in

* See the author's remarks in Stevenson's 'Birds of Norfolk,' vol. iii. page 887.

the Norfolk and Norwich Naturalists' 'Transactions' in the years 1890-91 (pp. 227-30); 1891-92 (pp. 323-28); 1894-95 (pp. 114-17); 1895-96 (pp. 225-27); 1896-97 (pp. 293-95). "A Sketch of Yarmouth Fishes" also ran through the 'Naturalists' Chronicle' in 1896-97.

My best thanks are here tendered to Mr. T. Southwell, F.Z.S., of Norwich, for the ever-ready help he has afforded in identifying new species, and unravelling knotty points; indeed, it was greatly at his instigation that I have undertaken the task of working out the fishes of the district.

The following abbreviations will be helpful:—* my own additions to the local list; † additions to county list; C. common; R. rare; F. frequent; R. R. rather rare; A. accidental; (?) doubtful species; [] has a doubtful claim to Yarmouth list.

Gasterosteus aculeatus. Three-spined Stickleback. C.—Abundant, and generally alone inhabiting the ditches where found. Brackish water does not inconvenience it, and I have found it alive and strong in the refuse left by the draw-netters on the beach. It undoubtedly comes down involuntarily on the ebb, thousands being drawn through the sluice-gates opening from the marsh-ditches into the rivers. Variously armoured varieties occur. Local, "Stanickle"; male, "Redbreast."

**G. pungitius*. Nine-spined Stickleback. C.—Shuns the society of the preceding species, which bullies it; generally but not always found by itself. Prefers entirely fresh water. Like *G. aculeatus*, is often spotted with the parasitic fish-louse, *Argulus foliaceus*. Local, "Tinker"; "Sweep."

G. spinachia. Fifteen-spined Stickleback. F.—Is frequently taken in summer in Shrimp-nets. Often found on Breydon; occasionally "nesting" there. Local, "Sawback."

Perca fluviatilis. Perch. C.—Numerous in the broads and rivers; often takes a bait in brackish water, on the verge of the "salts" coming up on the flood. It appears to be seeking the Shrimps which come with it. Is very partial to the Ditch Prawn, *Palæmon varians*. Hickling Broad, Reedham Ferry, and several other of its favourite haunts might be mentioned, but large specimens are much less frequently taken than formerly. It is said that the *Anacharis* weed has injuriously invaded many

of its spawning quarters, and undoubtedly the unrest caused by excursion steamers has acted detrimentally to the spawn. Complaint is also made of the decrease in numbers. Anglers should invariably throw back under-sized specimens. A Perch was taken at Ormesby on Sept. 4th, 1866, weighing $4\frac{1}{2}$ lb.; length, 18 in.

†*Scorpæna dactyloptera*. American Rose Perch. A.—Found a specimen of this rare British fish (the second for Great Britain) in a shrimper's catch on April 29th, 1894; length, $5\frac{3}{4}$ in. (see 'Zoologist,' 1894, pp. 230 and 431). An eight-inch example was brought to me from Lowestoft, taken off that port on Dec. 11th, 1895.

Labrax lupus. Bass. F.—Not infrequently taken in spring in draw-nets, but rarely runs to any size. One, 8 lb. 10 oz.; length, $30\frac{1}{2}$ in.; May 28th, 1895; another, 10 lb., May 18th, 1896. In October small specimens running from four to seven inches in length are not infrequently washed ashore. The Bass is not a favourite for the table. "Very rarely off Breydon" (Pagets). Local, "Sea Perch."

Acerina vulgaris. Ruffe. C.—Plentiful enough in some broads, less common in river-ways nearer town. Local anglers say that when you catch a Ruffe you may shift your ground. It is exceedingly attentive to those who fish in shallow waters. Rarely attains seven inches, but have seen one or two specimens taken that length.

Mullus surmuletus. Surmullet. R. R.—In the old fishing time was common enough, being often taken in the Mackerel-nets. "In some Mackerel seasons abundant, in others scarcely seen; in May, 1831, 10,000 were sent in one week to the London markets" (Pagets). Have weighed an example at 2 lb. Quite a number were taken in trawl-nets in the North Sea in May and June, 1896. [The Red Mullet, *M. barbatus*, remains yet to be discovered locally.]

Pagellus centrodonthus. Sea Bream. R. R.—A few years ago, during the old-time landing of Herrings on the beach, was common, numbers being occasionally taken by draw-nets. Is now but seldom caught.

Chrysophrys aurata. Gilthead. A.—"Taken once or twice" (Pagets). One is also recorded from Pakefield, near Lowestoft, in April, 1829.

Cottus gobio. Miller's Thumb. C.—In the rivers and broads. Gurney records a Water Rail picked up on the Yare, and a Dab-chick on the Wensum, both being choked in attempting to swallow fish of this species.

C. scorpius. Father-lasher. C.—One of our most abundant species in the warmer months. The shrimpers net thousands. They are voracious feeders, and are often found simply stuffed with Shrimps. When held in the hand they distend their gills, producing a curiously faint humming sound; hence the local urchins term them "hummers." Large ones occasionally take a bait. Local, "Hummer," "Hard-head," "Sea-bullhead."

(?) † *C. scorpius* var. *grænlandicus*. Greenland Bullhead. R. R.—[Mr. Southwell considers this to be a variety of *C. scorpius*. As its colours are so distinctive, and there is to my mind a marked difference in the shape of the head, I am inclined to accept it as a true species. I have obtained several, one of which, in spirits, is preserved in Norwich Museum. A five-inch specimen in Shrimp-net, March 7th, 1895; another, $5\frac{1}{2}$ in., Dec. 19th of same year. My first record, April 24th, 1890.]

**C. bubalis*. Bubalis. A.—Although said to be not uncommonly met with in the Wash, it is the veriest straggler here. First specimen met with April 7th, 1891, in a Shrimp-net. Now in Norwich Museum. A second, Aug. 17th, 1895; a $4\frac{1}{2}$ -in. specimen taken in a draw-net.

Trigla cuculus. Red Gurnard. F.—Immature specimens are not infrequently taken in Shrimp-nets. In the adult state it is far less common than *T. gurnardus*.

(?) *T. pæciloptera*. Little Gurnard. R.—[Recent authorities discard this as a true species; Couch does not. Dr. Lowe (*Trans. Norf. and Nor. Nat. Soc.* vol. iv. p. 21) gives it a place in his list as follows:—"On May 15th, 1873, while trawling in the Lynn roads with Mr. Ewles, I obtained a single specimen of this rare species; length, $2\frac{3}{4}$ in." &c. In the summer of 1890 I met with several fish answering Couch's description of the supposed species, and forwarded them to Dr. Günther, who pronounced them as the immature of *T. cuculus*; and that *T. pæciloptera* was no true species.]

T. hirundo. Tubfish. R. R.—A much more suitable name is Sapphirine Gurnard, by which some writers distinguish the

species. In the immediate neighbourhood it is by no means common. Great numbers are, however, at times brought in by trawlers. As an article of food it is held in high esteem by the poorer classes. Exceedingly abundant in May, 1897 ('Zoologist,' ante, pp. 275, 339). A twenty-inch example ashore alive, Dec. 21st, 1890. Local, "Latchet."

T. gurnardus. Grey Gurnard. C.—Was once abundant, forty or fifty in the course of an hour being sometimes taken by sea-anglers from the piers. At intervals some smart takes are landed even now. Was unusually numerous offshore in September, 1894. Draw-netters occasionally secure a "trunk"-ful in a night.

†*T. lineata.* Streaked Gurnard. R.—The late Rev. C. J. Lucas, in 1895, met with a specimen in a fish-shop, forwarding it to me for identification. It is now in Yarmouth Museum; length, $9\frac{1}{2}$ in. I met with a second on Nov. 22nd, 1895; length, $12\frac{1}{2}$ in. And a third, taken off Lowestoft on March 9th, 1896, came into my hands a few hours later. I have met with one or two others since.

Agonus cataphractus. Pogge. C.—A most abundant species, taken in great numbers by shrimpers. Local, "Hardhead."

Trachinus draco. Greater Weever. F.—Abundant in fish-shops during the summer months, mostly brought in by trawlers. Occasionally entangled in the Herring-nets. It is excellent in the fry-pan, although only eaten by the poorer classes. Its dorsal fins appear to possess exceedingly venomous properties, with which fishermen righteously dread contact. A pricked finger produces intense pain, and often acute inflammation follows. It was no unusual thing to meet a fisherman with his arm in a sling from poisoned finger, when the local trawling industry was in a healthier condition than it is at present.

T. vipera. Viper Weever. C.—Taken in numbers offshore in the summer months. In as bad repute as the previous species, fishermen "heeling" it in the sand on sight. The fish knows well, even when lying on the sand, how to direct its dorsal spines at any near object, and has a deft way of pricking the fingers of those who carelessly handle it. An example was taken from a salt-water pipe on the quay on May 15th, 1897, after having been pumped in at the jetty, and traversing a system of pipes into a tank, and thence out

once again. It was kept awhile as a novelty by some cab-drivers in a pan of salt-water in their shelter ('Zoologist,' ante, p. 339).

Sciæna aquila. Maigre. A.—Has been met with in the autumnal Herring season. One scaling 75 lb. taken on Oct. 23rd, 1875; length, 4 ft. 9 in. A specimen taken off Sheringham in 1841 is in the Norwich Museum. Another cast ashore at Aldborough, in Suffolk, Aug. 30th, 1868; length, 5 ft.; weight, 84 lb.

Scomber scomber. Mackerel. C.—An important Mackerel fishery was carried on here in May and June until the end of the sixties, when the species, possibly on account of the incursions of trawlers into its feeding grounds, fell off to unremunerative numbers. Strangely enough, it has put in an appearance contemporary with the Herrings, and in September immense "takes" are sometimes made. Twenty "lasts" were landed on the fish-wharf on Sept. 25th, 1897, and on Oct. 9th one boat alone had as many as two "lasts," or 24,000 fish. Some of the drifters go out on purpose for the Mackerel. A specimen taken in November, 1881, scaled $2\frac{3}{4}$ lb.; length, 20 in.; girth, $10\frac{1}{2}$ in. An example shown me on June 15th, 1897, was entirely minus the Mackerel markings on its back, being of a whole-coloured deep blue, like an immature Pollack ('Zoologist,' ante, p. 340).

(?) **Scomber scriptus*. Scribbled Mackerel. R. R.—[This by some authorities is referred to as a variety of *S. scomber*. The first recorded county specimen I saw in the flesh at a meeting of the Norwich Naturalists' Society in September, 1894. Since then I have kept a look-out for the species, and have met with it as follows:—A twelve-inch example, June 25th, 1895; the first Yarmouth record. It is now in the Glasgow Museum. Another, Dec. 9th, 1895; also on Sept. 26th, 1896—length, 18 in.; Oct. 15th, 1896, $15\frac{1}{2}$ in.; and three or four others since.]

S. thynnus. Tunny. A.—"Small specimens not infrequently taken during the Mackerel fishery" (Pagets). An example weighing 224 lb. was taken on Oct. 6th, 1870; length, 6 ft. 9 in.; girth, 4 ft. 4 in.

Auxis rochei. Plain Bonito. A.—In June, 1839, two examples were taken off Yarmouth, and came into Mr. Yarrell's possession (Yarrell's 'British Fishes,' vol. i. p. 160). Mr. Gunn, of Norwich, records a third taken off Yarmouth, now in Cam-

bridge Museum, in July, 1847. Small examples *undoubtedly occur* amongst Mackerel, but are overlooked.

[*Naucrates ductor*. Pilot Fish. A.—“Many years ago I saw a specimen freshly caught on the *Suffolk coast*, and sent for preservation to the late Mr. J. Tims, of Norwich, in whose house it was unfortunately destroyed by a fire on the premises” (J. H. G.). *Vide* Dr. Lowe’s “List of Norfolk Fishes,” Trans. Nor. and Nor. Nat. Soc. 1872–73, p. 30.]

Zeus faber. Doree. F.—I saw a twelve-inch example captured in a pool left by the ebb at the Bure-side in the autumn of 1879. More commonly taken in the trawl. A fine example, two feet in length, weighing $8\frac{1}{4}$ lb., was entangled in a Scotchman’s drift-net off Yarmouth on Oct. 2nd, 1896; a very unusual “take” in that fashion. Its maw contained seven full-grown Herrings. A tiny specimen, the size of a crown-piece, was taken in a Shrimp-net on May 18th, 1897. Local, “Johnny Dory.”

Sparus niger. Ray’s Bream. A.—Has been cast ashore during rough weather. Mr. Gurney mentions a specimen in the Norwich Museum as taken off Yarmouth. Another recorded Jan. 25th, 1847. A fine specimen was toppled ashore at Caister during a heavy wind on Nov. 23rd, 1894; length, $25\frac{1}{4}$ in.; depth, 9 in.; fork of tail, $8\frac{1}{4}$ in.; pectorals, $6\frac{1}{4}$ in.; weight, 6 lb. 10 oz. Now in Yarmouth Museum. Another taken in Herring-nets, Oct. 29th, 1895; length, $23\frac{1}{2}$ in.; weight, $5\frac{3}{4}$ lb. A pen-and-ink sketch of this fish appeared in the ‘Daily Graphic,’ Oct. 31st, 1895.

Lampris luna. Opah. A.—Four locally recorded examples have come to grief during stormy weather. The Pagets record two “found in the breakers, Nov. 1828; another, Dec. 24th, 1823”; a third came to grief in 1878; and a magnificent example was found alive on Caister beach by a coastguardsman, after a storm, on Oct. 17th, 1891. It has been preserved, and is in the possession of Mr. J. R. Nutman, fish merchant. Length, 38 in.; girth, 41 in.; width at “shoulders,” $5\frac{1}{2}$ in.; weight, 51 lb.

†*Capros aper*. Boarfish. A.—I saw the first Norfolk recorded specimen lying on a shrimper’s stall on July 9th, 1881. It had been taken amongst “pink shrimps” that morning. Length 5 in. A second found, at high-water mark on north beach, by Mr. B. Dye on May 1st, 1882.

Trachurus trachurus. Scad. C.—Is a frequent take amongst

Mackerel and in the Herring nets. Fine examples are often found lying at the harbour mouth, undoubtedly thrown overboard as useless. It is seldom or ever eaten here. Small ones are frequently thrown ashore by the surf in October, running from $2\frac{1}{2}$ in. to 4 in. in length. The Pagets say "it is rarely caught; and those that are taken are generally very small." According to J. H. G., "Frequent off Lowestoft." It may be that the young ones referred to were keenly in pursuit of young fry (*vide* Norf. and Nor. Trans. 1872-3, p. 31). Local, "Horse-mackerel."

**Xiphias gladius*. Swordfish. A.—One came ashore at Palling beach on Nov. 30th, 1881. Length, 7 ft. 3 in.; sword (minus a small portion), 2 ft. 3 in.; radius of tail, 2 ft. The stomach contained food reduced to thin mucus. Another, taken into Lowestoft on Sept. 27th, 1893. Length, 9 ft. It was entangled in a Mackerel net.

**Gobius minutus*. Little Goby. C.—Is abundant in the summer months; and is a frequent "take" in the Shrimp-nets. Is common enough on Breydon, where it seems quite at home on the ooze of the shallows. Has a curious way of hiding itself from view when disturbed, by stirring up the soil with its large ventral fins. Local, "Gobble-belly," "Gobble-guts."

G. unipunctatus. One-spotted Goby. C.(?)—Dr. Lowe thus disposes of it: "Norfolk estuary. Very common, Yarmouth.—Pagets." I have deemed it advisable to put a "?" to its local claim, as I have been unable to identify the species at present. It can hardly have been overlooked. Pagets' record is equally obtuse: Note—"Gobius minutus, Spotted Goby; occasionally taken in Shrimp nets." He refers to no other.

†*G. ruthensparri*. Two-spotted Goby. A.—I first obtained this species on April 13th, 1891, from a local shrimper. Curiously enough the same individual brought me a second on the 15th; and a third on the 18th; since which I have obtained no others. The "turning up" of more than one example of a hitherto rare or unrecorded species is a notable thing in ichthyology. It was, if we except Dr. Day's finding, prior to this, unrecorded for the county. It is decidedly the handsomest of the *Gobiidae*. Couch's figure, described as the Broad-finned Goby, fig. c1. vol. ii. p. 165, is identical in appearance with the above species. His so-called Two-spotted Goby, No. 3, fig. c,

p. 159, is a very poor representation. Dr. Lowe (Trans. Norf. and Nor. Nat. Soc., 1872-3, p. 32) introduces a so-called new species, *Gobius pusillus*. He also says (*Ibid.*, 1893-4, p. 637): "His (Mr. Patterson's) claim for it as the first recorded Norfolk specimen is rendered doubtful by Mr. Day having pronounced my *G. pusillus* to be the same as *G. ruthersparii*. I think, however, that the two are quite distinct, and that *G. pusillus* is a good species." Against this deduction I am convinced that *G. pusillus* and *G. minutus* are identical, and his description exactly tallies with the last named.

**G. auratus*. Yellow-speckled Goby. C.—Preferring a sandy habitat, this species abounds off this coast all the year round. The shrimpers net thousands; but no use is made of it, either as bait or food. Local, "Gobble-belly."

**G. niger*. Rock Goby. R. R.—Was first recorded for Norfolk on June 13th, 1876, from an example taken at Hunstanton. I obtained the second, and the first for this locality, from a shrimper on Aug. 13th, 1889. I have had several since. It undoubtedly turns up every summer.

†*Latrunculus pellucidus*. White Goby. R. R.—Identical with *Gobius gracilis* of Couch, and *G. albus* of Yarrell. The first example of this new Norfolk species was brought me on June 9th, 1890, by a shrimp lad. It was identified by Dr. Günther. Subsequently a bribe of twopence apiece brought me so many that I had to withdraw the premium. Since that year I have very seldom met with the species. Its Smelt-like appearance, notwithstanding its prominent teeth, undoubtedly confounds it with the young of *Osmerus eperlanus*.

Callionymus lyra. Yellow Skulpin. C.—The Pagets describe it as "Very rare; taken in Shrimp-nets, April, 1816 and 1826." I have found it to be very commonly taken in the shrimpers' nets, a score being no unusual take in a morning's tide. Pagets give also "the Sordid Dragonet" (or Dusky Skulpin) as "also taken, May, 1816." As a matter of fact it is identical with *C. lyra*, being either the female or immature male. Local, "Tiger-fish."

Cyclopterus lumpus. Lump Sucker. F.—Large examples taken occasionally in Shrimp and draw nets. "One taken in river, 1819" (Pagets). Several taken in April and May, 1895, some two stones in weight; a previous record is of one 15 lb. in

weight, taken in a shrimp net on March 25th, 1890. Numbers of small examples, the size of chestnuts, and of a bright emerald-green colour, are taken every spring. A 26 lb. fish taken in a shrimp net on Feb. 24th, 1897.

Liparis vulgaris. Sea Snail. C.—Against Dr. Lowe's "Norfolk estuary; not common" (Trans. Norf. and Nor. Nat. Soc., 1872-3, p. 33), I have to record it as exceedingly abundant off Yarmouth in the summer months. The smacksmen complain of the way in which this species attach themselves to their shovels when heaving overboard the "rubbish" from the trawl-net. It is not eaten. Local, "Suckers."

[*L. montagui*. Montagu's Sucker (?). Dr. Lowe (Trans., 1872-3, p. 33) refers to this as "Frequently taken . . . much more common here than the preceding in the estuary; and several times in the river opposite Lynn in fresh water at low tide." Col. Montague says it "inhabits only the rocky parts of the coast." The sequence is obvious, yet I have a suspicion it has occurred at Yarmouth; but at present I have failed to identify it.]

Lophius piscatorius. Angler. R. R.—"Not uncommon in the roads, and sometimes in the harbour" (Pagets). Have known it taken in the draw-net. Smacksmen always examine the "pockets" of large specimens in search of fish there "stowed." Occasionally large soles and other edible fish are extracted. A large specimen, weighing about 1 cwt., was brought to me on June 3rd, 1897. A 30 lb. example, on July 23rd, 1897, contained a large Father-lasher. Local, "Pocket-fish."

Anarhichas lupus. Wolf-fish. R. R.—Fine examples are not infrequently brought in by smacksmen in the spring. There is no demand for it as an article of food, although proprietors of fried-fish shops clandestinely cut it up and sell it. Its flesh is excellent. Local, "Cat-fish."

Centronotus gunnellus. Butter-fish. C.—A frequent "take" in Shrimp and draw nets. It is exceedingly greasy and slippery. Local, "Nine-eyes."

Zoarces viviparus. Viviparous Blenny. C.—Very plentiful in summer months, taking a bait freely. Is excellent eating. Caught in small trawls on Breydon for Crab bait. On Nov. 17th, 1890, I extracted no less than 133 young ones, 1½ in. in length,

from an example measuring $10\frac{1}{2}$ in. They oozed forth on the slightest pressure. Local, "Eel-pout."

**Atherina presbyter*. Atherine. F.—Very numerous in Lowestoft harbour in summer months, where it affords immense diversion to visitors who angle for it. As a rule it is uncommon at Yarmouth, a few turning up now and again amongst Smelts. A great quantity caught off Gorleston in 1891; but there was no demand for them as food. Local, "Smolt," "Sand Smelt."

Mugil capito. Grey Mullet. F.—Very uncertain in its visits. Was formerly very plentiful on Breydon in summer, where shoals abounded amongst the *Potamogeton* or "wigeon-grass," seeking a vegetarian dietary. Very difficult to ensnare: "poke"-nets, i. e. a small-meshed net, have nets of much larger mesh on either side, and, rushing against these, the fish bagged itself. Frequently a whole school would jump over and escape. On Sept. 2nd, 1880, a 22-inch specimen took a Mussel bait at the fish wharf. No local angler has successfully fished for it. Becoming yearly scarcer; undoubtedly owing to the increasing sewage polluting the rivers, and the shoaling up of the "flats."

**M. chelo*. Lesser Grey Mullet. A.—A lad, throwing out a line from a raft, close by Breydon, accidentally hooked a specimen of what Dr. Günther has decided to be the variety of *M. chelo* known as *M. septentrionalis*. This was on Nov. 10th, 1890. Length, $7\frac{1}{2}$ in. Without doubt *M. chelo* sometimes occurs.

Labrus maculatus. Ballan Wrasse. A.—"A young one, about eight inches long, was taken with a hook in the outer harbour at Lowestoft in August, 1852" (J. H. G.). Dr. Lowe records one: "Yarmouth, April 15th, 1868."

Gadus morrhua. Cod. C.—Great numbers of Codlings are taken in some winters from the piers; crowds of small ones occasionally, in October, swarm up the Yare to Breydon, where they give unlimited sport, taking Mussel by preference. Their stomachs are generally found crammed with Shore Crabs (*Carcinus mœnas*; local, "Sea Sammies"). Curiously, the Lugworm (*Arenicola piscatorium*) is the favourite pier-bait. Sometimes huge Cod are taken. The Scotchmen who "drift" for Herrings supplement their catches by lining for Cod; and large specimens are taken off Winterton in the winter months by "long-liners." I have found a Cod's maw full of Norwegian Lobsters (*Nephrops norve-*

gicus). Local, "Norway Shrimps." A well-defined specimen of the "Bull-dog" variety of this species was taken on the Britannia Pier, Dec. 21st, 1895. Length, 21 in. Have met with others.

? [Variety —. "Rock Cod."—On Christmas Eve, 1890, I examined a peculiarly red-and-yellow mottled Cod of some eighteen inches. The fisherman termed it a "Rock" Cod, and did not seem to look upon it as an unusual occurrence. It was very like the Dorse (*Gadus callarias*) figured in Couch's 'Fishes,' vol. iii. p. 66. I have on one or two occasions seen tendencies to this coloration in what I felt satisfied was *Gadus morrhua*.]

G. aeglefinus. Haddock. C.—Locally it is rare; but great quantities are brought in by trawlers from the North Sea. Occasionally taken from the piers.

G. luscus. Bib. C.—"One found on the beach, 1813" (Pagets). Small examples commonly enough taken in Shrimp- and draw-nets. It inflates with wind (through fright ?), and cannot submerge itself after being taken, the Gulls generally ending their ebb-drift seawards from the shrimpers' refuse. Great numbers on Breydon during September, 1897. Local, "Bastard Whiting," "Whiting-pout."

†*G. minutus*. Power Cod. R.—I found the first recorded Norfolk specimen amongst the draw-netters' refuse by the seaside on April 6th, 1890; length, $3\frac{3}{4}$ in. Very like a small codling at first sight; the larger eye, however, at once distinguishes it. Several others since, notably one on Oct. 18th, 1894; length, 10 in.

G. merlangus. Whiting. C.—Abundant in late autumn and during winter. Those caught from the beach and piers do not run large. Large specimens occasionally from deeper water. Largest on local record, March 29th, 1891; weight, $7\frac{1}{2}$ lb.! One, $22\frac{1}{2}$ in. long, on wharf, March 7th, 1895; this is large for the east coast. Two Whitings caught by smack 'Dutch Trader,' February, 1871; length respectively, 26 in. and 24 in.

†*G. pollachius*. Pollack. C.—Strangely enough, although so plentiful around Norfolk, this species remained unrecorded until I identified it from a number of juvenile examples I caught with rod and line in the entrance of the Bure on May 8th, 1888. These averaged eleven inches in length. For many years youngsters had been caught under the cognomen of "Pinnikin

Coles." During the spring of 1888 extensive dredgings were made in Lowestoft harbour, when this species was found to literally swarm. Adult fish are locally scarce. Local, "Pinnikin Coles."

G. virens. Coal-Fish. F.—The Pagets record it as "plentiful," undoubtedly confounding it with *G. pollachius*. Long-liners take big ones occasionally off Winterton. Have known it taken in the Bure.

Lota vulgaris. Burbolt. R.—Recorded from Yare, Bure, and Waveney. Lubbock ('Fauna of Norfolk') says:—"I have known many caught, and some two and three pounds in weight." The late Dr. Norman hooked a 2 lb. 2 oz. specimen at Burgh some years ago. I have not yet met with the species.

**Merluccius vulgaris*. Hake. R. R.—Not on Pagets' list. Large examples occasionally brought in by smacks. Held in light esteem locally as an article of food.

Molva vulgaris. Ling. F.—Taken by long-liners; seldom, however, inshore. I have met with very juvenile examples from the shrimpers' nets. A 3½-inch specimen, taken on April 14th, 1890, was very Sand Launce-like in shape, and also singularly unlike the adult in colour. Back orange; upper sides white, lower of a brownish tint, a streak of white between on either side; belly bluish white; fin-margins orange, the first and second dorsals ending with black spots.

**Motella tricirrata*. Three-bearded Rockling. R. R.—In the spring of 1882 a fine specimen taken in a draw-net. One taken by line from the Britannia pier, Sept. 25th, 1890. Two or three since. A fourteen-inch male, sent to Mr. Southwell by the late Sir E. Newton from Lowestoft, Jan. 19th, 1894.

†*M. cimbria*. Four-bearded Rockling. A.—I found a specimen on the beach amongst some draw-netters' refuse, May 23rd, 1889. This is new to the Norfolk fauna. One since that date. This species grows to a larger size than *M. mustela*, which in some respects it much resembles.

M. mustela. Five-bearded Rockling. F.—Often taken in Shrimp- and draw-nets; sometimes in purse-nets in the river. "A very small specimen taken, Dec. 17th, 1821" (Pagets). Have known it taken on a hook on Breydon, and off Gorleston pier.

**Raniceps trifurcus*. Lesser Forkbeard. A.—"A small

example at Great Yarmouth" (Couch's 'Fishes,' vol. iii. p. 123). A second, and the first, to my knowledge, of what Yarrell terms "one of the rarest of British species" ('Fishes,' vol. ii. p. 293), was brought me alive by a Shrimp-lad on April 11th, 1891; length, $2\frac{3}{4}$ in. Another on May 6th.

Ammodytes tobianus. Lesser Sand Launce. C.—"Not uncommon; sometimes found in the sand off Winterton" (Pagets). Taken both by Shrimp and draw-netters. [I am strongly of opinion that the Short-nosed Launce, *A. cicerelus*, occurs rarely off this coast.]

**A. lanceolatus*. Larger Sand Launce. C.—More often left stranded by the draw-netters than taken in Shrimp-nets. Is undoubtedly, with "Herring syle," a favourite prey of the Terns.

Hippoglossus vulgaris. Holibut. F.—Occasionally taken on long-lines. One captured on June 1st, 1867, measured 72 in. in length; breadth, 30 in.; weight, 161 lb. Two recorded for March, 1868; weight, respectively, 140 lb. and 198 lb. Very large specimens come to our fishmongers from Grimsby; one, on April 1st, 1897, measured 7 ft. in length.

Rhombus maximus. Turbot. C.—Small examples taken in wolders, Shrimp and draw nets. Some very large specimens occasionally brought in from the North Sea. Two on the wharf on Feb. 1st, 1896, when gutted, weighed 29 lb. and 30 lb. "Double" Turbots not unfrequently occur, when both sides are found dark coloured, and spiny processes adorn the under surface as well as the upper. Occasionally a notch in the head holds one eye, which can see either way. If partially blotched underneath, the spines correspond thereon to the upper surface. I met with a fourteen-inch albino Turbot on March 1st, 1894; a narrow orange ring encircled each eye; and a fifteen-inch example, also white on the upper surface, on May 24th, 1897 (Zool. ante, p. 339).

R. levis. Brill. C.—Small examples common enough inshore. I examined an albino, 15 in. in length, on Feb. 13th, 1892. Irregular orange-red lines ringed the eyes; the fins were margined by a yellowish grey hue. A malformed Brill occurred on Oct. 19th, 1891, with the dorsal and anal fins rounded off under the tail as in the Müller's Topknot. [Very rarely a curious sport (is it an undescribed species?) comes to hand. On Feb. 26th, 1897, I saw a specimen of what might be termed a

"Brill-Turbot." It was thought to be a hybrid. It exhibited a curious blending of the two species. It resembled the Turbot in shape; the head was a Brill's, as were the markings; and it was deficient in the spines which distinguish the other side.—Trans. Norf. and Nor. Soc. 1896-97, p. 295.]

**R. megastoma*. Sail Fluke. A.—First recorded for the county, June 18th, 1875; Norfolk Estuary. I obtained a five-inch specimen on May 3rd, 1893, which was taken in a shrimper's net on that date.

†*Zeugopterus punctatus*. Müller's Topknot. A.—A fine adult specimen was brought me by a shrimper on June 11th, 1890; length $7\frac{1}{2}$ in. Not before recorded for county. Now in Norwich Museum. A second example, taken in a trawl-net on Smith's Knowle, on March 11th, 1894; length, $6\frac{1}{4}$ in.

Pleuronectes platessa. Plaice. C.—Large specimens appear to be decreasing; a great many immature are brought in and sold in the early winter. The trawlers mercilessly pursue the spawning fish. Prior to the advent of "carriers" to the fishing fleets, trawlers anchored in the roads; their fish were "ferried" ashore in huge ferry-boats, run up the beach on "troll-carts," and sent off to London by train. Trolls and ferry-boats are now obsolete. A solitary troll-cart is preserved in Yarmouth Museum. "Peds" (hampers) of huge Plaice were then quite an institution. Examples are occasionally blotched (never wholly grey) upon the under side; in the patches red spots inevitably correspond with those on the upper side.

P. limanda. Dab. C.—Occasionally hooked on sandy patches a short way up the river, seldom on a muddy bottom. Frequent from the piers in summer. Small ones are named by the shrimpers as "Cock Soles." Local, "Sand Dab."

**P. microcephalus*. Smeared Dab. C.—Considerable numbers from the trawlers. Not often caught inshore. Very ruddy-tinted examples, like the second figure in Couch's 'Fishes,' vol. iii. p. 188, occur occasionally. Is erroneously named by fishers and others the "Lemon Sole," with no tangible reason whatsoever.

†*Hippoglossoides limandooides*. Long Rough Dab. R.R.—I first recognized this as local, from a specimen sixteen inches in length, on a fishmonger's slab, on Jan. 20th, 1891. I am surprised at its prior non-identification, as I have found several examples since.

†*Pleuronectes cynoglossus*. Pole, or Craig Fluke. R.—On Feb. 11th, 1892, I found an eighteen-inch example amongst a package of Soles. Another on the wharf, taken by a wolder, on March 21st, 1893; length, 19 in. Dr. Günther, to whom I forwarded it, confirmed my finding. Two small ones on March 14th, 1892. I found another in a heap of Dabs, Jan. 20th, 1896, which is now in Cambridge Museum. Under the name of "Witches," this and the preceding species are frequently taken off the Yorkshire and Lincolnshire coasts.

P. flesus. Flounder. C.—Exceedingly abundant in neighbourhood. Ardently angled for on Breydon, prize matches being contested. The "runs" or "drains" veining that estuary at low-water teem with them, particularly in August. They feed on small Crabs, Opossum Shrimps, &c. Herons, *Ardea cinerea*, in turn, devour swarms of juveniles. With a "butt" pick made of straightened Cod-hooks I have taken from eighty to a hundred Flounders in an hour or two. Sea-caught Flounders are lighter hued than those taken on a muddy bottom. In early August they are plump; in September often thin. In January they spawn on Breydon; have taken twenty-inch examples in twenty feet of water. "Left-handed" Flounders are frequent, often three in every dozen taken. Local, "Butts."

Solea vulgaris. Sole. C.—Shrimpers often net examples; now and again one taken on a hook off the piers, a nineteen-inch fish being taken there in September, 1897. Have seen them on Breydon. The largest of which I have a record weighed $4\frac{1}{2}$ lb.; length, $23\frac{3}{4}$ in.; width, $8\frac{3}{4}$ in. Somewhat scarcer than formerly. An example minus even the vestige of a tail, Feb. 25th, 1896; length, $7\frac{1}{2}$ in.; width, $4\frac{3}{4}$ in.; three inches short of normal length. At a fish-shop, on Jan. 20th, 1890, I examined a Sole which had the mouth reversed, and opening towards the dorsal fin instead of turning down to the ventrals.

**S. lascaris*. Lemon Sole. A.—On Jan. 21st, I met with a small example on the fish-wharf, which I forwarded to Mr. T. Southwell for identification. Only recorded previously for the Norfolk estuary—"several examples." [I have reason to believe careful investigation would add the Variegated Sole, *S. variegata*, to the local list.]

Salmo salar. Salmon. R.—"Small ones have very rarely

been taken in the Mackerel-nets" (Pagets). One taken in a flooded meadow near Norwich on Dec. 1st, 1873. Sir Thomas Browne (1662) observes:—"Salmon no common fish in our rivers, though many were taken in the Ouse, in the Bure or north river, in the Waveney or south river, in the Norwich river but seldom, and in the winter. Four years ago fifteen were taken at Trowse mill (Norwich) at Christmas." Thanks to the pollution of our rivers, we have said adieu to this king of fishes. A seven-pound example taken in the draw-nets in the summer of 1888. A trawler brought in, on Feb. 27th, 1896, a forty-two-inch specimen. An eight-inch example taken in a draw-net on May 6th, 1896.

S. trutta. Salmon Trout. C.—Uncertain in its visits, this species appears in the summer months. It is sought by draw-netters, who do not catch so many now as formerly. Great care is taken not to damage the fish in handling. Rarely netted in the Bure and Waveney. [The so-called "Bull-trout," although ignored by Dr. Günther as "not attributable to definite species," has as much right, I think, to the distinction of a true species as the Twait and Allis Shads. It is occasionally taken here.]

S. fario. Common Trout. R.—Lubbock refers to this species as occurring in the Yare and Bure. At long intervals two or three fine examples have been taken at Acle. Several years ago the late Rev. C. J. Lucas turned out a number in Filby Broad, whence they had access to Rollesby and Ormesby Broads. Some increased in size, but they soon diminished in numbers. A local angler fishing at Filby on April 7th, 1896, hooked and landed a 2 lb. 9 oz. Trout; length, 18½ in. It took a lobworm, and when dissected was found to contain several thrown over as ground-bait.

Osmerus eperlanus. Smelt. C.—Very abundant offshore in the autumn, and on Breydon. Occasionally many scores are netted in the serving of a tide, both on the Breydon "flats" and at the harbour mouth. In summer the water is fairly alive at times with young fry. Large ones sometimes taken. I have several eleven- and twelve-inch records. On April 20th, 1891, a twelve-inch example weighed six ounces. Dr. Lowe refers to one "a foot long, which weighed only a quarter of a pound" (Trans. Norf. Nor. Nat. Soc. 1872-73, p. 41). An eight-inch

example taken in North river, Oct. 11th, 1893, with a double mouth.

+*Maurolicus pennantii*. Pearlsides. A.—Whilst turning over some freshly-thrown seaweed left by a draw-netter on the beach near the harbour mouth, I found a living example of this species. It was in company with some young Herrings and a number of Three-spined Sticklebacks. The double row of emerald dots running on either side the abdomen and the protruding lower lip proclaimed its identity forthwith; length, $1\frac{1}{2}$ in. Three others were left on the sands after a gale on Feb. 24th, 1890, and another was picked up on Scratby beach in March, 1893.

Esox lucius. Pike. C.—Abundant in our broads and rivers. Attains to a large size, and is noted for its voracity. The late Dr. Norman recorded in 'Land and Water' one captured near Yarmouth which weighed $36\frac{1}{2}$ lb., measuring 54 in. Very stunted individuals are found in the ditches north of the town.

Scomberesox saurus. Skipper. A.—But one record for Yarmouth; date uncertain (*vide Trans. Norf. Nor. Nat. Soc. 1872-73, p. 42*).

Belone vulgaris. Garfish. C.—An example was taken within five miles of Norwich (Lubbock). Occasionally several are landed in a day at the wharf with Mackerel. Is in no repute as food, being very oily. Local, "Guard-fish."

Cyprinus carpio. Carp. R. R.—Found in some broads, seldom taking a bait. On two or three occasions I have seen specimens that were found struggling in the salt-water on Breydon, having come down stream on the ebb-tide, one seven pounds. The dimensions given by Lubbock of one taken in a broad are as follows:—"Length, $29\frac{1}{4}$ in.; girth, 29 in.; weight, $13\frac{1}{2}$ lb."

**C. auratus*. Goldfish. R. R.—Dr. Lowe, on Mr. Gunn's authority, says "these fish are bred in several mill-ponds in the county." A local angler-artist assures me this fish breeds in the Ormesby waterworks reservoir.

**C. carassius*. Crucian Carp. R. R.—Very local; common in one or two broads, but never takes the hook. Taken at Fritton when the decoy is netted. "A solitary specimen has twice been observed in the Yare" (Lubbock). Dr. Lowe, on J. H. G.'s authority, says "it is common in ponds in East Norfolk. . . . Known to hybridize freely with Common Carp." The same writer mentions a specimen weighing 1 lb. 7 oz.

Gobio fluviatilis. Gudgeon. C.—“In plenty in most of the broads” (Pagets). Lubbock says, “Abundant in the higher parts of rivers, but not, I think, otherwise than of rare occurrence amongst the broads.” I have seen it in swarms in shallow water at Filby Broad; I caught a number with small red worms. Is never specially fished for.

Leuciscus rutilus. Roach. C.—Abundant in all our rivers, ponds, and broads. On the neap tides it comes as far down as the entrance of the Bure at Breydon, biting freely. Occasionally shoals, overtaken by the returning “salts,” may be seen struggling, nose out of water, up river, many perishing. One was taken in 1880 at Ormesby, weighing $2\frac{1}{2}$ lb. The late Dr. Norman records one 2 lb. 2 oz.

[*L. cephalus*. Chub. (?).—I picked up a $11\frac{1}{2}$ -inch example in the Waveney on April 20th, 1890. Probably it occurs in some numbers in that river. Against this we quote Lubbock:—“It is entirely unknown in the Bure, Yare, and, I believe, the Waveney; is very large in some Norfolk rivers—the Ouse, the Thet, and the Wissey near Stoke Ferry.” Its true claim to a place in the local list at present remains doubtful.]

L. erythrophthalmus. Rudd. C.—“Common in the rivers and broads” (Dr. Lowe). The late Dr. Norman caught one, weighing 3 lb. 1 oz. It is the characteristic fish of Heigham Sounds and Hickling Broad, where, when once discovered, it takes the hook with a dash and impetuosity which makes it a great favourite among local anglers. It is a pity it is useless for the table. Below Thurne mouth, in the Bure, it runs small and in no great numbers.

L. vulgaris. Dace. C.—Occasionally hooked on the river Bure and the broads, but not of any size. It was possibly introduced by being thrown in from the bait-cans of anglers.

L. phoxinus. Minnow. R. R.—Becomes more numerous in the higher reaches of the rivers. Possibly introduced in the same manner as the preceding.

Tinca vulgaris. Tench. C.—Fairly common in the broads, and in ponds, ditches, and other still waters. Have known it hooked occasionally, but is generally captured in “poke” and funnel nets made on hoops. Have seen specimens from the Bure. The late Dr. Norman hooked one weighing 5 lb. 14 oz. Thrives

in several clay-pits in disused brick-yards a few miles out of Yarmouth. [The Golden Tench is believed to have become naturalized, and to have bred sparingly in some of the broads.]

Abramis brama. Yellow Bream. C.—Abundant in the broads and rivers. Large ones taken at Acle. Dr. Norman caught one weighing 8 lb. 12 oz. It is reported that a Norwich angler on one occasion placed eleven Bream (from a catch in the Wensum) in the scales, which swung the balance at 55 lb. Only a few old-world rustics ever attempt to cook this species in the Broadlands. Large takes are sometimes thought worthy to feed the pigs on.

A. blicca. White Bream. C.—Abundant everywhere, more especially in the Bure, preferring rivers to broads.

[*Leuciscus buggenhagii*. Pomeranian Bream. R. R.—Much doubt exists as to the status of this so-called species. It is variously supposed to be a hybrid between the Rudd and the Bream; whilst Prof. von Siebold "proved it to be a hybrid between *Abramis brama* and *Leuciscus rutilus*." I am as firmly convinced it is a cross between *A. blicca* and the Roach, with both of which the Bure abounds; and the Pomeranian Bream is taken there more frequently than elsewhere. It has the characteristics of the two species.]

Engraulis encrasicholus. Anchovy. R.—"A specimen found on the beach, May, 1830" (Pagets). By chance taken in the nets of the 'long-shore fishermen. Dr. Lowe records it as frequently caught in stow-nets near Lynn, running to eight inches in length. I met with an example taken among Herring, Oct. 23rd, 1893.

Clupea harengus. Herring. C.—Great Yarmouth owes its existence, importance, and prosperity to the Herring. The principal fishery commences in September and ends at Christmas. Roughly speaking, a thousand boats, local and Scotch, fish from the port; about 11,000 hands all round are directly connected with the fishery, and some 2000 miles of drift-nets are spread "to reap this harvest of the sea." A "last" of Herrings is 13,200 fish. A boat sometimes brings in twenty "lasts"; sometimes a boat's nets do not fall in with the "schools" of Herrings, and a night's work may amount to a capful of fish. Between 20,000 and 30,000 "lasts" are taken yearly. The "history and circum-

stance" of the Herring fishery affords interesting reading. Food is seldom found in the stomachs of Herrings, yet they must devour myriads of Crustacea and Entomostraca. I dissected a six-inch example found on the south beach, April 13th, 1890; its maw contained 143 Opossum Shrimps. Have also found a six-inch example full of roe. Some imported Norway Herrings, on Dec. 17th, 1895, measured 15 in., girth 7 in., weight $14\frac{1}{2}$ oz. A long-shore averages 10 in. I believe the Norway variety is simply aged Herrings.

C. sprattus. Sprat. C.—Abundant in October and November. Most of those sold hail from Aldeburgh and Southwold. Local boats no longer venture out for the fishing. On Dec. 5th, 1895, I examined some sprats; the ova were discernible with a strong lens. An unusual and out-of-season catch was made the third week in February, 1896, when roe and milt were found well developed. The ova differed very little in relative size from those of a Herring. I consider the Sprat spawns in March, at no great distance from the land.

C. alosa. Allis Shad. R. R.—Draw-netters occasionally fall in with the species. "Not uncommon with the Herrings" (Pagets). One taken near Norwich, 1840. Numerous (Twaite's also), May, 1895. Several, $7\frac{1}{2}$ in. to 9 in., examples washed ashore, May 4th, 1891. One taken April 27th, 1893, weighed $4\frac{3}{4}$ lb.

C. finta. Twain Shad. R. R.—One taken in draw-net, April 19th, 1893. Length, 17 in.; weight, $4\frac{3}{4}$ lb. The Pagets do not mention this species. Seen it netted on Breydon. Usual number of spots on either side, nine. Saw one, May, 1895, with fifteen.

C. pilchardus. Pilchard. R. R.—Occasionally straggles into the Herring shoals. Fish curers who detect the species invariably nail it up "for luck" on a beam in the curing house. "Some few generally taken every year in the Herring nets; in some years they have been abundant, as in 1780 and 1790; and in 1799 so many were taken that one 'tower' received upwards of a 'last' as his perquisite" (Pagets). Nearly every year a few are observed.

Anguilla vulgaris. Sharp-nosed Eel. C.—The largest local record is as follows: March 26th, 1808, one taken in the river between the harbour mouth and Haven bridge. Length, 6 ft.;

girth, 21 in.; weight, 42 lb. Abundant in all our water-ways. Tons are taken every autumn in Eel-sets on their way to the sea; and a number of men pursue the species in the warmer months with "babs" composed of threaded Worms, and find the business sometimes fairly remunerative. On May 29th, 1892, I examined some Eels, and found the ova well-developed in one. I am strongly of opinion that many moderate-sized Eels do return to the rivers in spring, which is contrary to the recognized theory that they do not. A creamy white Eel, 15 in. long, taken in the Bure, June 6th, 1895. The "lips" had a pink tinge, as had the margin of the dorsal and anal fins.

A. latirostris. Broad-nosed Eel. C.—Not so abundant as the preceding species. Large ones often taken on the broads; one in the Bure, Aug. 10th, 1866. Length, 3 ft. 8 in.; girth, 10 in.; weight, $7\frac{1}{4}$ lb.

Conger vulgaris. Conger. C.—"Not uncommon in the roads; one, weighing nearly 50 lb., caught in 1808" (Pagets). Not infrequently found ashore during severe weather, with the wind E. Getting into shallow waters, the frost "nips" the Conger's bladder, which, distending, floats it helplessly on the surface, and the waves topple it ashore. I have met with several thus cast on the sands; notably one in the year 1879, which weighed 14 lb.

Siphonostoma typhle. Broad-nosed Pipefish. R. R.—I have met with specimens occasionally on the beach, and in the shrimpers' refuse.

Syngnathus acus. Greater Pipefish. C.—Often taken in the shrimpers' nets. Shrimpers often dry and varnish these fish, placing them on their "overmantels." Local, "Snakefish."

**Nerophis æquoreus*. Ocean Pipefish. R. R.—This species is not infrequent. The first specimen recorded for the district was found at the seaside in some draw-netters' refuse on April 12th, 1890. Now in Norwich Museum. I have seen several since.

Syngnathus lumbriciformis. Worm Pipefish. R.—I have found this on the beach, and in the Shrimp-nets. An adult, carrying ova, $4\frac{1}{2}$ inches in length, brought to me on Aug. 2nd, 1890. Under *S. barbarus*, the Pagets undoubtedly refer to this species.

S. hippocampus. Hippocampus. A.—"Occasionally met

with" (Pagets). About the year 1870 one was reported as having been found on the beach. I have not yet met with a locally taken example.

Orthagoriscus mola. Sunfish. A.—The Pagets record an occurrence in November, 1821. A second, taken in 1835, is in Norwich Museum. An example was toppled ashore near Caister on October 26th, 1860. Length, 4 ft.; weight, 154 lb. "Sometimes we meet with a *mola* or Moonfish, so named from some resemblance it hath to a crescent in the extreme part of its body, from one fin to another. One being taken near the shore of Yarmouth, before break of day, seemed to grunt and shiver like a hog" (Sir T. Browne). A few miles off Yarmouth a small example was taken in a "dydle" (a kind of landing net) over the side of a trawler, September, 1896. Length, 18 in.; from extremity of dorsal to that of anal fin, 2 ft. 4 in.; weight, 10 lb. Now in Yarmouth Museum.

Acipenser sturio. Sturgeon. R.—Has been rarely taken in the river and on Breydon. One large example stranded on the "flats," Oct. 10th, 1871; length, 7 ft. 10 in.; girth, 3 ft. 10 in.; weight, 392 lb. Instances of its taking a hook are rare. A 6½-ft. specimen was taken on a hook baited with Herring, off the beach, Dec. 10th, 1894. It was a "slinky" fish. The mouth was cut across to extract the hook.

Carcharias glaucus. Blue Shark. F.—Unfortunately too well known to the Herring fishermen, whose nets often suffer from its teeth and struggles as it becomes hopelessly rolled up in them. Examples upwards of 10 ft. long sometimes brought to the wharf; are invariably thrown on the manure carts.

**Galeus vulgaris*. Tope. R. R.—Occasionally taken with Herrings. Fishermen know them as "shovel-heads," from the great breadth of the head. Occurs more frequently round Hunstanton. One taken in a Shrimp-net, Aug. 20th, 1891; length, 14 in.

Zygæna malleus. Hammerhead. A.—"One taken Oct. 1829; head now in Norwich Museum" (Pagets). I believe the tail accompanies it.

**Mustelus vulgaris*. Smooth-hound. R. R.—Occasionally taken during the Herring fishery. I have seen several at one time on the wharf; and on one occasion saw three lying dead upon the sands.

Lamna cornubica. Porbeagle. R.—Scarcely a fishing season

passes over but one or two specimens occur. "One taken, 1818; another, 1822" (Pagets). I saw a 7-ft. example, Oct. 17th, 1891; another, 6 ft. 6 in., on Sept. 30th, 1893; yet another on Sept. 28th, 1894; length, 9 ft.

Alopecias vulpes. Thresher. R.—The earliest record of a locally taken example is July 4th, 1867; length, 14 ft. 5 in., of which the tail accounted for 7 ft. 4 in.; girth, 6 ft. One landed at Lowestoft end of Sept. 1879. "It weighed half a ton, and its tail was 10 ft. long" (Dr. Lowe). Another was caught by some Palling 'long-shore fishermen on Oct. 2nd, 1884; length, 12 ft. Two small examples at Lowestoft, Sept. 1897 (Southwell, Zool. ante, p. 475); another, 10 ft. 2 in. in length, landed at Yarmouth, Oct. 9th, 1897.

Selache maxima. Basking Shark. A.—"Several of this species have been taken at different times" (Pagets). Query:—Can the Pagets have confounded any of these with *Lamna cornubica*? I have not yet met with the species.

Læmargus borealis. Greenland Shark. A.—An example, 15 ft. long, was captured in shallow water off Caister, Nov. 11th, 1885 (Trans. Norf. Nor. Nat. Soc. 1893–94, p. 643). Two others have occurred off the Norfolk coast, viz., one Jan. 21st, 1892, off Lynn; length, 13 ft. 2 in.; the other, July 12th, 1892, off Overstrand; length, 10 ft.

Scyllum canicula. Lesser Spotted Dog-fish. F.—"Our most common species" (Pagets). The fish must have changed about during the past fifty years, for a hundred Picked Dogs occur to one of this species. Frequently taken by trawlers, wolders, and rarely by shrimpers, from whom I have had specimens.

S. stellaris. Larger Spotted Dog-fish. R. R.—"One caught, 1828" (Pagets). Taken as in the preceding species. I have seen several on the beach and fish wharf.

Acanthias vulgaris. Picked Dog-fish. C.—An untiring foe to the Herrings, which it attacks even when gilled in the nets, biting out from the back chestnut-shaped pieces. Frequently the only catches of sea anglers from the piers. Found an example on Feb. 28th, 1890, on the beach; length, 27 in. A dead body was washed ashore on Jan. 23rd, 1890; a shoal of Dog-fish followed it into the breakers!

Squatina vulgaris. Monk-fish. R. R.—"One taken, 1817;

another, 1822; and others previously" (Pagets); and several others since. A 49-inch female gave birth to twenty-two young ones on board a fishing-smack; they were landed alive in a half-barrel of sea-water. Length of fresh-cast fish, 11 in. Two are in Norwich Museum.

Torpedo vulgaris. Torpedo. A.—An example is recorded from Lowestoft, Dec. 1st, 1883. Another, cast ashore alive at Palling, Feb. 23rd. 1883 (T. Southwell).

Raia clavata. Thorn-back Ray. C.—Large examples abundant in the neighbourhood during the winter months. Small examples frequent in the draw-nets. I have found the young in the egg-case cast up on the shore. Eaten with relish by the poorer classes. Local, "Roker."

†*R. radiata*. Starry Ray. A.—The first specimen recorded for the county came to hand May 11th, 1897; length, 22½ in. Very "Roker"-like in appearance, but distinguishable at once by its marvellous array of spines. It was beautifully mottled on the disc. It was forwarded to Norwich Museum, where it now is. The taxidermist assured me he is in no hurry to preserve another.

R. batis. Blue Skate. C.—Grows to considerable size in local waters. Numbers taken by long lines.

**R. maculata*. Spotted Ray. C.—Frequently caught in Shrimp-nets; also on long-lines. In great esteem amongst the poorer classes. Local, "Homer."

†*R. miraletus*. Cuckoo Ray. R.—[This well-marked species had escaped notice as a locally occurring species until Feb. 4th, 1897, when I secured a fine female example, full of ova, from the size of hemp-seed up to chestnuts. It was taken on a steam-lugger's long-line. A smaller specimen, a male, was brought in on Feb. 16th ('Zoologist,' ante, p. 235). I have since seen two or three others. As the fishermen "worked" from Yarmouth Roads northwards as far as Grimsby, returning with their catch, some doubt may exist as to the claim this species has upon this list. I am almost certain, however, that it should be included.]

R. pastinaca. Sting Ray. R.—"A specimen taken in a Shrimp-net, August, 1813" (Pagets). Another recorded in 1869; length, 3 ft. 6 in.; weight, 56 lb. A third taken off shore, Oct.

1880, of a kindred size. I have known the fish on more than one occasion to be cut up and sold at fried-fish shops. A 2-ft. example on the fish wharf, Jan. 5th, 1897; it was furnished with a double "sting" or barbed dart. Presented by Mr. J. W. de Caux to Yarmouth Museum. [I am strongly of opinion that the *Shagreen* and the *Long-nosed Rays* have occurred; of the former I am convinced I saw a side exposed for sale in 1895.]

Petromyzon marinus. Sea Lamprey. R.R.—Is now and again netted on Breydon. I have seen two or three which were found struggling on the surface of the river as if affected by the sewage.

**P. fluvialis*. Lampern. C.—It is frequent in April, when shrimpers and draw-nets take many of them. I found a number dead upon the sands in April, 1890. They ascend the rivers to spawn. What Lubbock erroneously remarks with regard to the preceding species applies most certainly to this:—"Abundant in the Yare in April and May, when they run up to spawn." He evidently refers to the "River Lamprey."

CUCKOOS SUCKING EGGS.

By J. H. GURNEY, F.L.S., F.Z.S.

I AM glad Mr. Davenport has raised the question of Cuckoos sucking eggs, which, with so many good observers, ought to be definitely settled. To describe them as habitually sucking eggs by choice, as is occasionally done in popular books, is a little misleading, for their primary intent, it must certainly be conceded, is to remove, not to eat them. The Cuckoo's throat is very wide; and if in the operation of moving eggs from some Wagtail's nest an egg slips down, we have what in court would be called presumptive evidence that they by no means object to it. But to charge a Cuckoo with sucking the eggs of Pheasants and Wood Pigeons, and even Grouse (as in the case of the game-keeper cited by Mr. Storrs Fox), seems absurd. There is nothing to induce a Cuckoo to enter the nests of these birds, and even if they did their shells would be very tough for its feeble bill; while probably Cuckoos would not peck or impale an egg at any time, but rather try to crush it between the two mandibles. I once saw in an open meadow a Cuckoo rise from near a Skylark's nest, from which it had no doubt retreated a few feet on hearing my approach; I immediately went up, and found a broken Lark's egg in the nest. This was evidently the work of the Cuckoo, which may even have been sucking the egg when I came up. There were no other egg-shells in the grass; and if that Cuckoo could have been promptly shot, I should have expected to find the remains of other Lark's eggs in its oesophagus. A gentleman wrote in 'The Field,' under the initials of W. R. G. (I have unfortunately not kept the exact reference), that while he was sitting with a friend in Dorsetshire, in a room looking out upon an ivy-clad wall, a Cuckoo passed the window. Knowing that a Pied Wagtail had her nest on the wall, the two observers approached the window, and watched the Cuckoo clinging to the ivy barely four yards away from them. They distinctly saw her

take an egg out of the nest, alight with it on the flower-border, and then, throwing up her head and apparently tossing the egg well back into her throat, crush the shell and let the contents trickle down. She then threw out the shell, which was picked up by the observers. If this is not accepted as good testimony, I would draw Mr. Davenport's notice to Mr. Sach's evidence in Dresser's 'Birds of Europe'; and especially to the narration by another correspondent of 'The Field,' H. L. W., who took out of a Cuckoo's crop, near Worcester, the recognisable remains of some eggs, two of which were Robins, and the rest apparently Hedge Sparrows ('The Field,' Jan. 28th, 1882). There is no bird about which so much has been written as the Common Cuckoo; and yet we have not reached the end of its history by a long way, as these stories show.

Dr. Bowdler Sharpe calls the egg-sucking Cuckoo a myth ('Birds of Great Britain,' vol. ii. p. 26); but the foregoing narrative seems inexplicable in any other way, and must be held to prove that, in one instance at any rate, a Cuckoo deliberately ate eggs. That they remove them from the nests of their dupes few will deny; and I have fairly clear evidence that they remove young nestlings as well.

On the 20th of last May I had been listening to the cry of the Spotted Crake on one of our Norfolk "broads," when three old Cuckoos, one behind the other, probably a hen and two cocks, flew past, and then over a small bog-myrtle bush, about two feet high, which stood quite by itself on the fen. In about three minutes one of these Cuckoos returned, and, either not seeing or heeding me, entered the little bush, where it remained certainly more than five minutes. I approached very cautiously, but found it impossible, in the long grass, to observe it even with strong binoculars.

A subsequent minute search revealed nothing in the bog-myrtle, but about eight feet from the bush was an empty Yellow Wagtail's nest, scattered round which, at distances varying from two to six feet, were five young Wagtails, doubtless dropped where they were by the Cuckoo. I take it that the object of this Cuckoo was by removing the young to make the old Yellow Wagtail build a new nest in which she might also deposit her egg. Probably

she was a Cuckoo with a special predilection for Yellow Wagtails' nests, and nothing else would suit her.

Cuckoos would probably be less likely to meddle with Hawfinches' eggs than those of most birds, because the nest of the Hawfinch is very rarely selected by them to lay in. Jays and Jackdaws were more probably the thieves which robbed the thirty-two nests alluded to by Mr. Calvert, assisted perhaps in their depredations by mice, which are very destructive little pests.

Mr. P. N. Emerson, in his 'Birds, Beasts, and Fishes of the Norfolk Broadland' (1895), writes:—"The evidence I have collected from [Norfolk] fenmen and others quite satisfies me that the Cuckoo does suck eggs; and, though I have never caught him, I have found eggs sucked that were whole before the Cuckoo hopped about them. . . . I have opened several Cuckoos' crops at the beginning of the season, and have upon some occasions found a yellowish substance which looked to me like nothing but egg." With this quotation I leave the much vexed question to those who have better opportunities than I have now of watching this inveterate nest-hunter.

We have had two nests this year with two Cuckoos in each; one belonged to a Pied Wagtail, and the other to a Spotted Flycatcher, but from what I can learn one Cuckoo only was reared in each nest.

NOTES AND QUERIES.

MAMMALIA.

Trapping Shrews and Voles.—I can fully endorse Mr. Pocock's remarks on the abundance of *Microtus glareolus* as regards my own county. I have trapped numbers of them, had many brought to me during haytime and harvest, and the cats often bring them into the house; but still, in districts that I have worked, *M. agrestis* is the preponderating species. *Sorex minutus* I have only succeeded in trapping once, though I am anxious to obtain specimens. *S. araneus* swarms, and *Crossopus fodiens* is common in suitable localities. *Mus messorius* I have never yet seen in the county. *M. sylvaticus* is ubiquitous, but though my friend Mr. James Backhouse and myself have examined a great number, we have not yet come upon the variety, as we consider it, *M. flavicollis*, though we are anxious to obtain a few specimens. *Muscardinus avellanarius* is very local.—OXLEY GRABHAM, M.A. (Chestnut House, Heworth, York).

CARNIVORA.

Common Seal in the River Arun, Sussex.—In September last a Seal made its appearance off the mouth of the Arun at Littlehampton, and finally ascended the river above Arundel, at a distance of about seven miles from the sea. It was eventually shot, and whilst in the flesh I was afforded an opportunity of noting the following particulars. It was a male specimen of the Common Seal, *Phoca vitulina*, about three parts grown, measuring 3 feet 7 inches in length, girth 27 inches, front flapper 7 inches long, weight 40 lb., with the molar teeth placed obliquely, one of the characteristics of this species. With an acquaintance of the neighbourhood for over fifty years, this is, I believe, the first instance of such an occurrence; the animal, in this case, being no doubt attracted by the shoals of Bass which in the early autumn are taken here in considerable numbers. Within the last two seasons I have seen two brought on shore, both of them exceeding 12 lb. in weight—one caught on light roach tackle, after nearly an hour's tussle of a most exciting kind.—PERCY E. COOMBE (Surrey House, Arundel).

AVES.

Local Name of the Sheldrake—Mr. C. B. Horsbrugh does not remember (*ante*, p. 508) seeing the name St. George's Duck in any book;

but, in addition to Dr. Bowdler Sharpe's 'Handbook,' mentioned in your editorial note, this name is to be found in Forster's 'Catalogus Avium in Insulis Britannicis Habitantium' (1817); Macgillivray's 'Manual of British Birds' (1846), and Swainson's 'Folk Lore and Provincial Names of British Birds' (1886). It seems to me to be co-related with St. George's Channel. In Clyde this bird is called Stocknet or Stockannet; and it also bears the following names in different localities:—Skelder, Skelgoose, Skeldrake or Duck, Scale Drake or Duck, Skell, Skeeling, Skeel Duck or Goose, Skeeling Goose, Shelder, Sheld Fowl, Sly Goose, Sky (?) Goose, Ruddy Goose, Bar-, Ber-, and Bur-gander, Bar Drake, Bay Duck, Burrow Duck, Links Duck, Pirennet or Perenet; *Gaelic*: Cra-ghiadh or Cradh-gheadh; and *Welsh* Hwyad-yr-eithin or Hywad-fruith.—HUGH BOYD WATT (3, Victoria Drive, Mount Florida, Glasgow).

Heron Choked by a Frog.—In the month of August, on the western borders of the Bay of Allan, in Kildare, Ireland, I came across an instance of a Heron being choked in the act of swallowing a frog.—H. MARMADUKE LANGDALE (Thorneycroft, Compton, Peterfield).

An unrecorded Norfolk Great Bustard.—Professor Newton, with his usual kindness, was good enough to inform me early in the present year that he had heard, through Mr. Osbert Salvin, of a Norfolk killed Great Bustard, which would shortly be sold by auction at Bournemouth, expressing a hope that if genuine it might be restored to its native county. After much negotiation and lengthened correspondence as to its history, I was enabled to purchase what has proved to be the finest male Bustard I have ever seen, and it is now in the collection of Mr. Connop, of Rollesby Hall, Norfolk, with many other local rarities. The history of the bird is briefly as follows. It was shot on Swaffham Heath about the year 1830 by a Mr. Glasse, Q.C., who then resided at Vere Lodge, Raynham, near Fakenham, Norfolk, and had remained in the possession of himself and Miss Glasse (his daughter), until it was sold with the effects of the latter shortly after her death at Bournemouth. I was able to obtain this information from a lady who knew Miss Glasse well, and had heard the history of the bird from her lips; it was also corroborated by Mr. Bear, the late Mr. Glasse's coachman, who assured me that his master had more than once mentioned the circumstance of his having shot the bird on Swaffham Heath to him; its history is therefore perfectly established. This superb old bird, if the estimated date of its death be correct, would not unlikely be the last male of the Swaffham drove—the last female having been killed in 1838.—THOMAS SOUTHWELL (Norwich).

Occurrence of the Mediterranean Herring Gull, Larus cachinnans, in Norfolk.—Whilst engaged in making a catalogue of the fine collection

of British Birds in the possession of Mr. E. M. Connop of Rollesby Hall, near Great Yarmouth, Mr. Cole, the Norwich bird preserver, pointed out to me a Herring Gull, which he said the late Mr. Stevenson had examined in the flesh, and believed to be *Larus cachinnans*. At his request Mr. Cole had noted the colour of the soft parts on the back of the case, and a careful examination led me to endorse the opinion expressed by Mr. Stevenson. Mr. Howard Saunders has also been good enough to examine the bird, and expresses himself quite satisfied with the correctness of the determination. The bird was shot by the veteran gunner, John Thomas, on Breydon Water, near Great Yarmouth, and sent by him in the flesh to Mr. Cole, on the 4th of November, 1886; it proved to be a male by dissection, and differed from the Common Herring Gull in the darkness of the mantle; the legs were a beautiful lemon yellow, and the bare ring round the eye deep orange-red. The mantle and orbital ring still retain their normal colour, but the legs have unfortunately been painted pale yellow, which Mr. Cole assures me he imitated from nature. The late season at which this southern species was killed seems remarkable; but still later in the same year (on December 26th), and in the same locality, a beautiful adult example of the Mediterranean Black-headed Gull was killed. I am not aware of any previous occurrence of *L. cachinnans* in Britain having been recorded.—THOMAS SOUTHWELL (Norwich).

Note on Flight of Green Sandpiper.—On the 4th September last I flushed in some marshes near here a bird that I thought, from its note and flight, to be a Wood Sandpiper (*Totanus glareola*). It rose with a very feeble sibilous note, and skimmed along close to the water till it settled again. I had some years ago killed the species close to the same spot, and that circumstance strengthened my conjecture as to the species. I flushed this bird several times without getting a shot, but its flight and note were always the same. Wishing to identify the bird, I went to the same locality again on the 7th September (three days later), when I again found the bird, which rose with the same note and flight. At its last rise I got a shot and killed it, and was surprised to find that it was the Green Sandpiper (*T. ochropus*). I have frequently met with this last species through many past years, and without exception it has risen wild, with a loud and shrill cry, invariably mounting high into the air, and never skimming the water. It seems, therefore, that the Green Sandpiper at certain times or seasons rises with the note and habit as to flight of the Wood Sandpiper. It would be interesting to know whether others have observed this variation of flight and note in *T. ochropus*.—W. OXENDEN HAMMOND (St. Albans Court, near Wingham, Kent).

Green Woodpecker boring in November.—While out after Wood-pigeons on November 16th, I was much surprised to see in a decayed

beech-tree a new boring made by a Green Woodpecker, which had been worked out to a depth of eight or ten inches. I put some green fir-boughs under the hole, and find to-day (November 25th) that the work is still going on.—JULIAN G. TUCK (Tostock Rectory, Bury St. Edmunds).

Supposed occurrence of a Great Spotted Cuckoo in Co. Kerry.—On April 30th of this year Mr. Thomas King, lightkeeper at Skelligs Rock Lighthouse, reported "a Great Spotted Cuckoo on Rock at 8 a.m., very tired-looking, fresh south-west breeze, blue sky, cloudy." Writing more fully to me, Mr. King says: "This bird was about the size of a Sparrow-hawk, but more bulky in body; its feathers were ruffled and loose, and it appeared very much fatigued. Back of bird a dark slate colour; wing same colour as back, but feathers white at the points; throat orange or yellow; breast a light slate colour or grey; under tail white; all tail feathers white at the points; crest of a lighter colour than back and slightly erected; bill of a bluish black; tail about seven or eight inches long and inclined downwards. When first observed was coming from a south-westerly direction and lit on rock, and when approached within twenty yards would fly about the same distance away to another rock, and continued so for about half an hour, flying at short intervals when approached, and seemed very much frightened at the large number of Puffins that were flying about at that time. I had a good opportunity of seeing it as I followed it about from one place to another with the telescope, and lost sight of it at the north-east point of rock amongst the Puffins. I trust this description will give you an opportunity of judging its species; as far as I can see by the books at station, it resembles no other bird but the Great Spotted Cuckoo." *Coccystes glandarius* (Linn.) has only once been obtained in Ireland. Its occurrence is noted by Thompson ('Natural History of Ireland,' vol. i. p. 364) as follows:—"The Cuckoo pursued by Hawks was taken by two persons on the Island of Omagh" (should be Oney, which is near Clifden, co. Galway). The bird when chased by the Hawks appeared fatigued, weak, and emaciated, as though it had taken a long flight, as Woodcocks and other birds of passage do on first arrival. The 1st of March, 1842, is said to have been the time of its capture." This specimen, which was in the Museum of Trinity College, Dublin, in 1890, was examined by Saunders, who found it to be in immature plumage ('Manual,' p. 279). It is probable that both specimens reached the west coast of Ireland from the north of Spain, and from the description of the plumage the Skelligs bird was most likely an immature male.—RICHARD M. BARRINGTON (Fassaroe, Bray, Co. Wicklow).

Presumed Summer Appearance of Shore Lark in Devon.—With reference to Mr. C. Dixon's letter on this subject (p. 471), I am anxious to state that I described exactly what I saw; and that to whatever species the

bird belonged, surely white under parts, with a conspicuous black band across the breast, cannot be referable to the Red-backed Shrike. I suggested the Shore Lark, though I knew its summer appearance would be opposed to experience, only because I could not identify the plumage I saw with that of any other bird.—H. W. EVANS (Athenæum, Plymouth).

Egg-producing Powers of the Common Redshank.—In connection with Mr. H. Alderson's note on the egg-producing powers of the Wryneck, the following may be interesting as illustrating those of the Common Redshank. The first clutch was completed about April 25th; these were taken about May 10th, and on May 16th there were two eggs in a new nest close by; these were destroyed by cattle or rooks, and by May 22nd another full clutch was laid a few yards away. These were taken on May 22nd or 28rd, and by June 1st four more eggs were laid eight or ten yards away; these were again taken, and the bird laid another full clutch, of which two were hatched on July 1st, the other two eggs being broken. Of course in this case it is much more difficult to be sure that all these eighteen eggs were the produce of one pair of birds; but the following are my reasons for thinking so: this is the first time that Redshanks have nested in this spot, at least for the six years I have known it; that never more than one pair of birds were seen there; and that all the nests were close together, but no two nests contained eggs at the same time. From these facts it would seem that gestation in this species lasts about five days.—A. BANKES (Otterwood, Beaulieu, Southampton).

Egg-producing Powers of the Dipper.—A somewhat similar case to that described of the Wryneck (p. 511) came under my own observation with regard to a Dipper. Twenty-eight eggs were taken from the same nest. After the twenty-eighth had been removed I was told of it, and with a little persuasion, and the help of a little current coin of the realm, I procured for the unfortunate bird immunity from further depredations. She laid four more eggs, and brought up three youngsters in peace.—OXLEY GRAHAM (Chestnut House, Heworth, York).

Egg-producing Powers of Birds.—I was much interested in Mr. H. Alderson's note in last month's 'Zoologist,' about the Wryneck, and I should like to ask him if he is absolutely certain that there were no *intervals* during the laying of the sixty-two eggs. I have often read that, by robbing a nest repeatedly, a bird may be made to lay an egg daily for about a month, but I have always considered that these reports were due to a want of careful observation in noticing the intervals between the batches of eggs laid. It seems to me impossible that a bird should be able to produce eggs at will, and I have always thought that the number of eggs to be laid was determined before the first was produced. If a female be examined just before

laying, the eggs to be laid are easily distinguished, as there is a sudden break off in size from the rest, not a gradual decrease. I have tried a good many experiments myself, and have never known a bird continue laying *an egg a day* beyond the normal number; but have always found that the bird continued laying up to its normal number, and that there was then an interval of a few days (during which, I suppose, the birds paired again) before the next lot was begun. For instance, in the case of a Starling which I experimented upon, there was an interval of five days between the two sets of eggs which it laid. I may mention that a good number of the birds experimented on deserted the nests. It would have been interesting if Mr. Alderson had noticed whether the eggs were fertilized, but I suppose they could not have been so.—BERNARD RIVIERE (Finchley Road, London).

Hours at which some Birds Sing.—In 'The Zoologist' (p. 472), Mr. Riviere touches on a very large subject, which occasionally attracts attention from observers, but which is yet far from having had an exhaustive treatment accorded to it. The hours at which birds begin to sing differ according to the season of the year and according to locality; they are also influenced in some other way, perhaps by weather conditions, as the same species occasionally show a marked difference of time in the hours at which they begin to sing on corresponding dates of different years. Mr. Riviere neglects to give the particular date in April, and thus deprives his note of the value it would otherwise have. In Shetland, during midsummer, no real darkness covers the land, and in consequence great activity prevails by night as well as by day. Larks and Wheatears sing at the hour of midnight, and the former has a long spell of uninterrupted song. Gulls of several species, Snipe, Arctic Terns, and other species of birds, make little difference between night and day, and are ever watchful for and ready to meet any night intruder on their haunts long before he comes near their home. Further south, in the Forth area, for instance, we cannot boast an absence of darkness in summer, and we find that bird-life in the main enjoys a temporary halt every night. Yet even here many species of birds, such as Coot, Little Grebe, Heron, Peewee, Curlew, Redshank, &c., pay little regard to the succession of day and night. At dawn of day the songsters break forth one by one in song, till the whole grove or moorland rings with their melody. The Lark is the species in this neighbourhood that hails the day, but in the woodlands, where Larks are absent, Blackbird and Thrush generally rival each other in breaking the silence of night. Few things are more interesting to the field-naturalist, or more delightful to him, than the music of the grove, when it succeeds the dismal period of waiting on in the stillness and darkness of night. For several hours he has had little to attract his attention save the hooting and shrieking of Owls, the plaint of the Peewee, or it may be the terrific yell of a Heron,

when suddenly the sky above him bursts into life, or the woodlands around him are transformed into an orchestra; and whereas in the darkness he had abundance of time to note the spasmodic bird-calls that disturbed the silence, he now finds himself totally unable to cope with the superabundance of life that has so suddenly emerged from the gloom. In the following notes I have recorded the hours, with dates and localities, at which I have heard various common birds begin their song; notes which may be of interest when compared with similar ones made in other parts of the country.

Thrush, *Turdus musicus*.—Earliest, June 15th, 1893, Fife, 2.28 a.m. On the previous night, June 14th, the last Thrush was noted in song at 8.7 p.m.

Blackbird, *T. merula*.—Earliest, 2.17 a.m., July 6th, 1894, Fife. Latest, 8.52 p.m., June 14th, 1893, Fife.

Ring Ouzel, *T. torquatus*.—3.46 a.m., April 16th, 1895, Dumfries.

Wheatear, *Saxicola œnanthe*.—Calling 9.35 p.m., June 2nd, 1893, East Lothian.

Redbreast, *Erythacus rubecula*.—Earliest, 2.6 a.m. (calling, not singing), July 6th, 1894, Fife. Latest, 9.30 p.m., June 21st, 1894, East Lothian.

Whitethroat, *Sylvia rufa*.—Earliest, 2.35 a.m., May 24th, 1898, Edinburgh. Latest, 8.14 p.m., May 5th, 1893, East Lothian.

Chiffchaff, *Phylloscopus collybita*.—Earliest, 3.15 a.m., June 8th, 1893, Edinburgh.

Willow Wren, *P. trochilus*.—Earliest, 3.3 a.m., June 8th, 1893, Edinburgh. Latest, 8.38 p.m., June 13th, 1893, Fife.

Sedge Warbler, *Acrocephalus schanobænus*.—Earliest, 1.32 a.m., June 8th, 1893, Edinburgh.

Field Sparrow, *Accendor modularis*.—Earliest on June 15th, 1893. I heard one give a snatch of its song at 1.25 a.m., but did not again hear the song till 4.5. On the previous night the Field Sparrow had ceased singing at 8.36 p.m., Fife.

Greenfinch, *Ligurinus chloris*.—Latest, 8.22 p.m. (the prolonged drawling note, given by Witchell as "zshweeo"), June 14th, 1893, Fife.

Chaffinch, *Fringilla cælebs*.—Earliest, 2.58 a.m., June 15th, 1893, Fife.

Bunting, *Emberiza miliaria*.—Latest, 8 p.m., May 5th, 1893, East Lothian.

Yellowhammer, *E. citrinella*.—Earliest, 2.37 a.m., May 23rd, 1894, Coldingham, Berwickshire. Latest, 8.22 p.m., June 14th, 1893, Fife.

Skylark, *Alauda arvensis*.—In connection with this species it may be interesting to give a series of dates, showing how the bird appears a little earlier as the season advances:—3.11 a.m., April 28th, 1893, Edinburgh;

2.39 a.m., May 11th, 1893, Edinburgh; 2.16 a.m., May 24th, 1893, Edinburgh; 1.59 a.m., June 3rd, 1893, East Lothian; 1.45 a.m., June 2nd, 1894, East Lothian.

This last entry records the time at which the birds begin their uninterrupted singing. From ten to twelve o'clock I had put up Larks frequently, but always in silence. At 12.16 midnight I heard the first Lark singing, not continuously from one spot, but giving snatches of his song as he flew; this method of song, resembling, however, the calling of the flocks in winter flight rather than real singing, continued for some time, and silence again ensued. The first bird to call, disturbed from my feet, rose at 12.38, and gave several notes as it mounted, but the real continued music of the Larks, as a whole, did not begin till 1.45 a.m.

Crow, *Corvus corone*.—2.48 a.m., June 15th, 1893, Fife. This refers to a bird calling without being disturbed by my presence. Such an explanation is necessary, as the Crow, like a number of other species, will sometimes call when disturbed by a midnight wanderer in its haunts.

Cuckoo, *Cuculus canorus*.—Earliest, 2.5 a.m., May 23rd, 1895, Lomond Hills, Fife.—ROBERT GODFREY (46, Cumberland Street, Edinburgh).

Notes from Scarborough.—The season so far, owing probably to the unusually mild weather, has been very unproductive in ornithological occurrences of sufficient interest to be worthy of note. A few Curlew Sandpipers were obtained on the coast during August; all that I saw were young birds. Early in September a Green Sandpiper was shot at Folkton, near Scarborough, and brought to me. It was one of a pair, the other escaping. On Nov. 2nd I had brought in a beautiful adult Spotted Crake, alive and uninjured. It had flown into some buildings, and was there captured by the workmen. On the same date the first Little Auk I have a note of for this season was taken at Filey. On Nov. 3rd a nice Albino Sparrow, with pink eyes and flesh-coloured legs and beak, was brought in from Yedmundale, near Scarborough. During the early part of the month a good many Waxwings have been about, and I know of seven which have been obtained mostly within a few miles of the town. A Peregrine Falcon has also been procured, and on the 15th I had an adult female Longtailed Duck brought in. This bird is seldom obtained in our district, and is only the second record I have of its occurrence.—W. J. CLARKE (44, Huntriss Row, Scarborough).

The Dictionary of British Bird-Song.—With reference to Mr. Hett's announcement of his Dictionary of Call-notes of British Birds, it may be of interest to readers of 'The Zoologist' to know that there will apparently be two "dictionaries," covering practically the same ground, published at about the same time. Ever since the publication of 'The

'Evolution of Bird-Song' I have been preparing my 'Dictionary,' which is now ready for the press. I may say I mentioned this to Mr. Warde Fowler last spring. I have, of course, obtained help from others, and gleaned from the literature of the subject.—CHARLES A. WITCHELL (Eltham, Kent).

PISCES.

The Porbeagle in Manx Waters.—The capture of this Shark, *Lamna cornubica*, is worth recording, as it is the first time it has been taken (or, at all events, recorded) off the Manx coast. It was found on November 3rd, by William Gawne, floundering in rather shallow water, in Derby Haven, at the south of the Isle of Man. He struck it with a bit of drift wood, "when it flew into the air"; he then killed it with a stone. When it reached me it was too far gone for preservation; but a photograph of it had been taken by Mr. Capam, by which it could be identified. I found it to be a good specimen, answering exactly to Day's description. I could not find the "spiracles" to which he refers as sometimes seen between the eye and first gill-opening. The colour was a dull grey, with peculiar sheen above and white beneath. It measured in a straight line from the tip of the snout to the centre of the tail, 37½ inches, and five inches more to the tip of the longest lobe. The viscera had been removed when sent to me; Gawne had noticed nothing in its stomach except "dirt." For some time previously he had noticed large fish in his nets cut clean in half, no doubt by this individual. Day says this species is not rare in the Orkneys and Shetland, has been met with all round the east coast,* and is common in Cornwall. It appears to be infrequent on the west coast, but has been taken in Dublin Bay and Belfast Lough.

Last summer I obtained a specimen of an allied species, the Thresher, *Alopecias vulpes*, from the Point of Ayre. It was even more decayed than this one. It also had not previously been recorded as Manx.

A movement is now on foot to have a good Museum in the Isle of Man, and I trust it will not be very long before we are able to provide for the due preservation not only of rare and unusual specimens, but of all the fish in our waters—a collection, in fact, which will afford a perfect illustration of the natural history as well as of the archaeology of the Isle of Man.—P. M. C. KERMODE (Ramsey, Isle of Man).

Large Tunny on the Essex Coast.—A large specimen of the Common Tunny, *Orcynus thynnus*, the pectoral fin being only about a foot in length, was found ashore on Foulness on October 24th. It was quite nine feet long, and as much in circumference. Mr. H. L. Matthams writes me that "a full-sized man sitting on the top could not touch the ground with

* Not uncommon at Great Yarmouth (*ante*, pp. 564–5).—ED.

his feet." It was estimated to weigh 5 to 6 cwt. The fish was quite fresh and was well fed, but its stomach was empty. Much of the flesh was eaten; this was red in colour and very firm when raw; fried, it resembled Eel, and fried well in its own fat, like that fish; boiled, it somewhat resembled Skate, the flesh being stringy.—EDWARD A. FITCH (Maldon, Essex).

The Germon in British Waters. — The Germon, or Long-finned Tunny, *Orcynus germe*, Day, has long been known as a visitor to British seas; but so infrequent are its occurrences on our coasts that the late Dr. Day could only enumerate four distinct occasions upon which this fine species had been obtained within our limits, the whole of these relating to the south-west of England. No specimens were taken between 1865 and 1889, in which latter year I obtained an example from a creek upon Burgh Marsh—*i.e.* upon the upper shores of the Solway Firth. I have now the pleasure of recording the capture of a second specimen of this handsome Tunny in the Solway Firth. On October 25th, 1897, a living Germon was found stranded upon the sands near Silloth. It was secured by a labouring man, who saw that he had obtained a prize. He had the sense to ride off to me on his bicycle; but unfortunately I was away from home. He then wrote to my taxidermist, and offered it to him as representing me; but he, being very busy, and supposing the fish to be a common Tunny, declined it, and wrote to me to report it. On my return home I found that the owner of the fish had kept it (in the hope of a high price) until it became decomposed, and he had to bury it in his garden. *I dug it up myself*, and found the fish but little altered in appearance. It was a Germon, with a pectoral fin sixteen inches long. It measured 27½ inches in girth, and 38 inches in length from the tip of the nose to the fork of the tail. I compared it with the figures given by Couch and Day. Couch's figure represents the Germon as tapering more sharply to the tail than was the case in this specimen; but perhaps this may be accounted for by the excellent condition of the recent wanderer. The left pectoral fin was damaged when disinterred; but I cut out the right pectoral fin as a proof of its identity. My identification of the 1889 specimen was confirmed at the Natural History Museum by Mr. Boulenger; since then I have procured other species of Tunny from the Solway Firth, as has my neighbour across the water, Mr. R. Service.—H. A. MACPHERSON (Allonby Vicarage, Cumberland).



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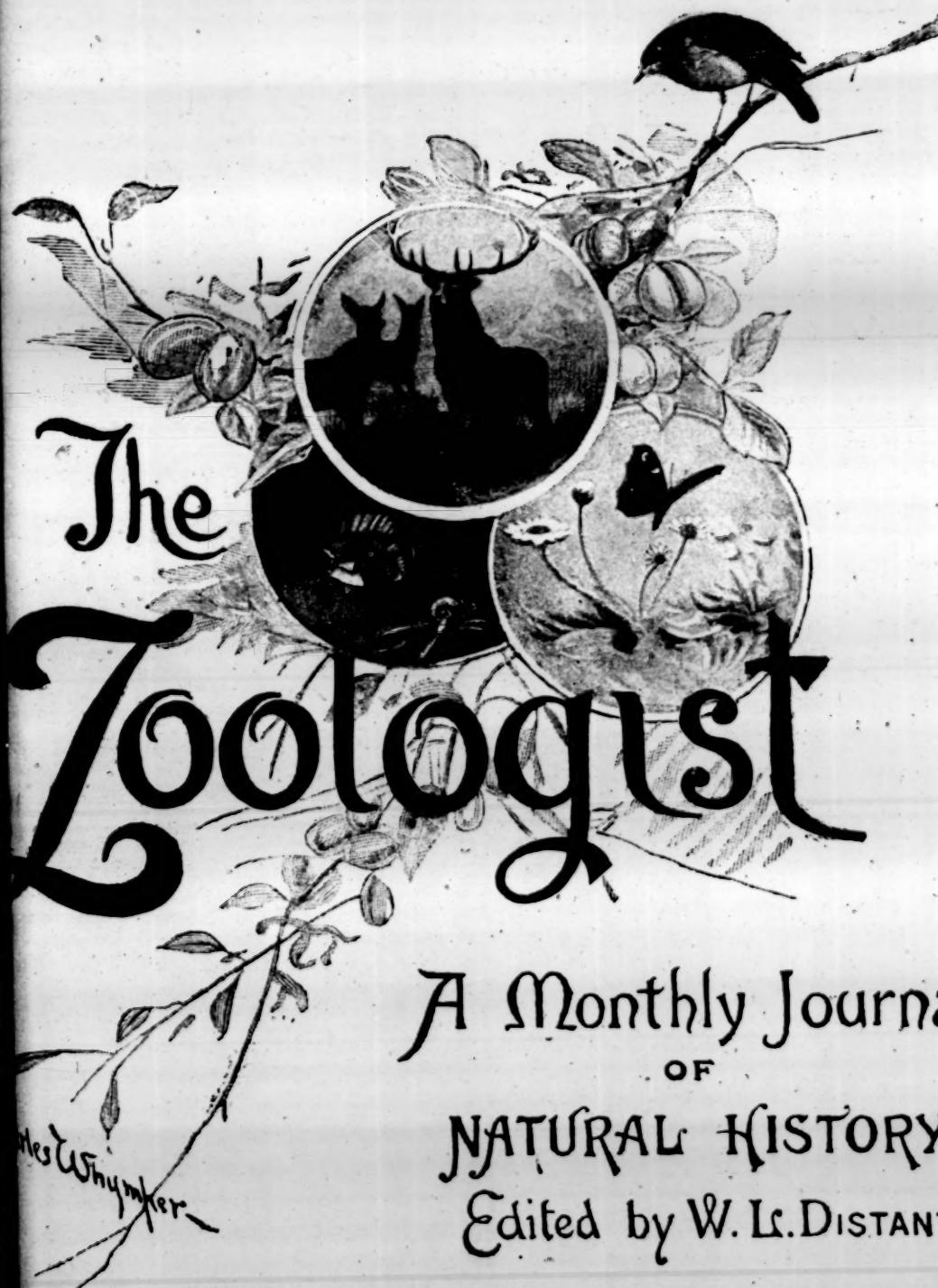
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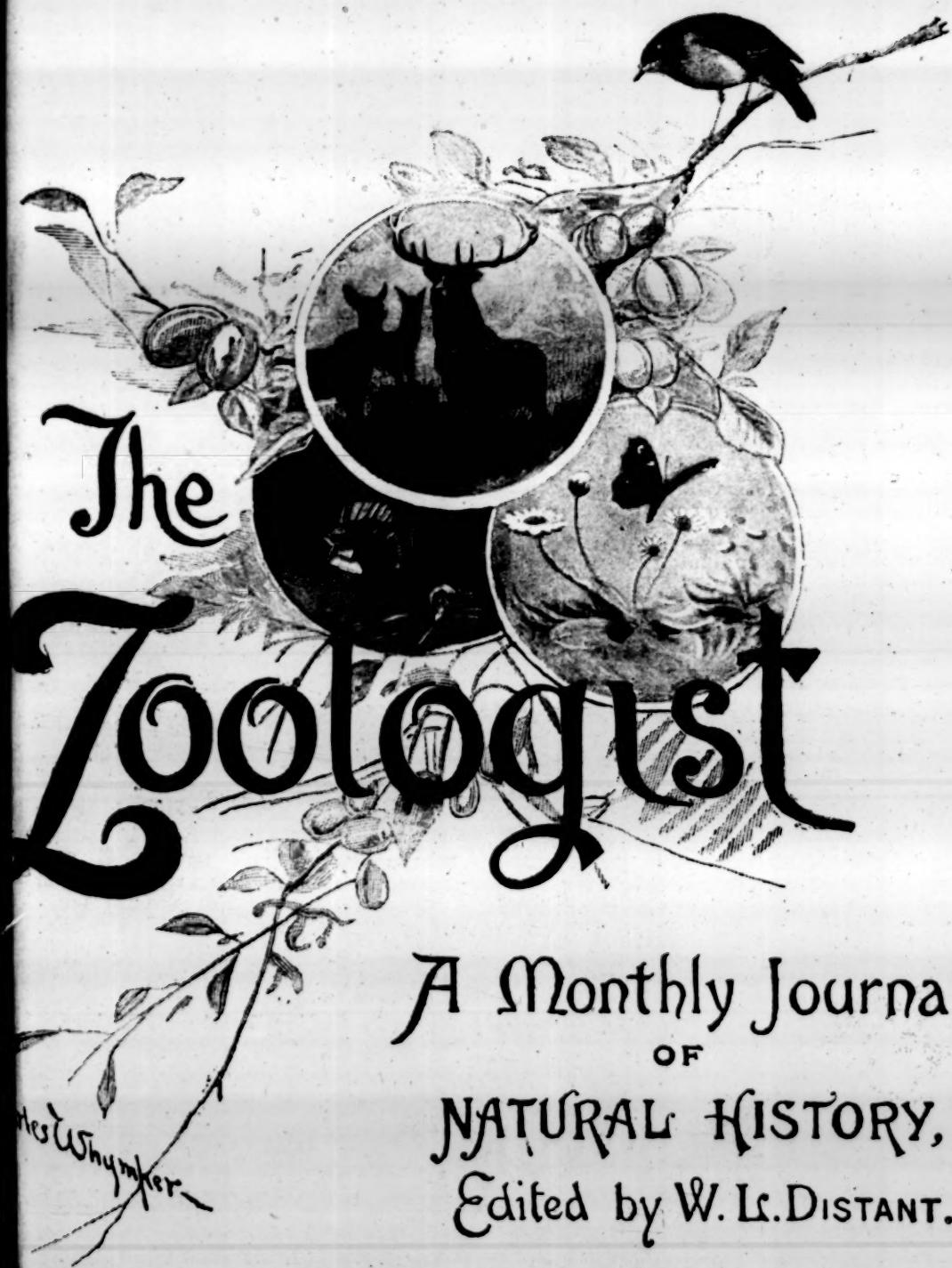
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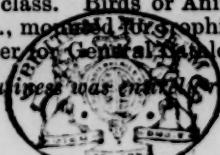
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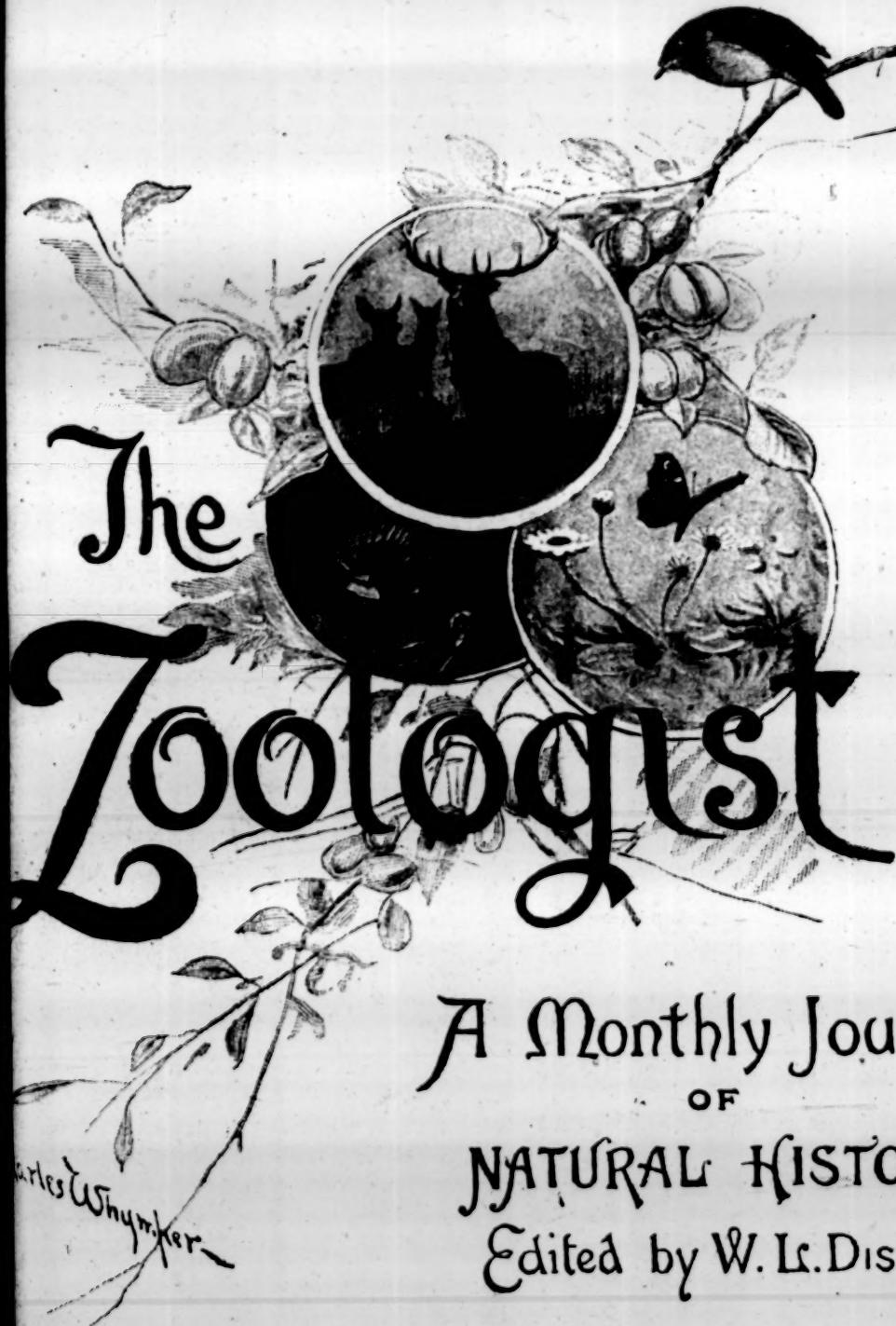
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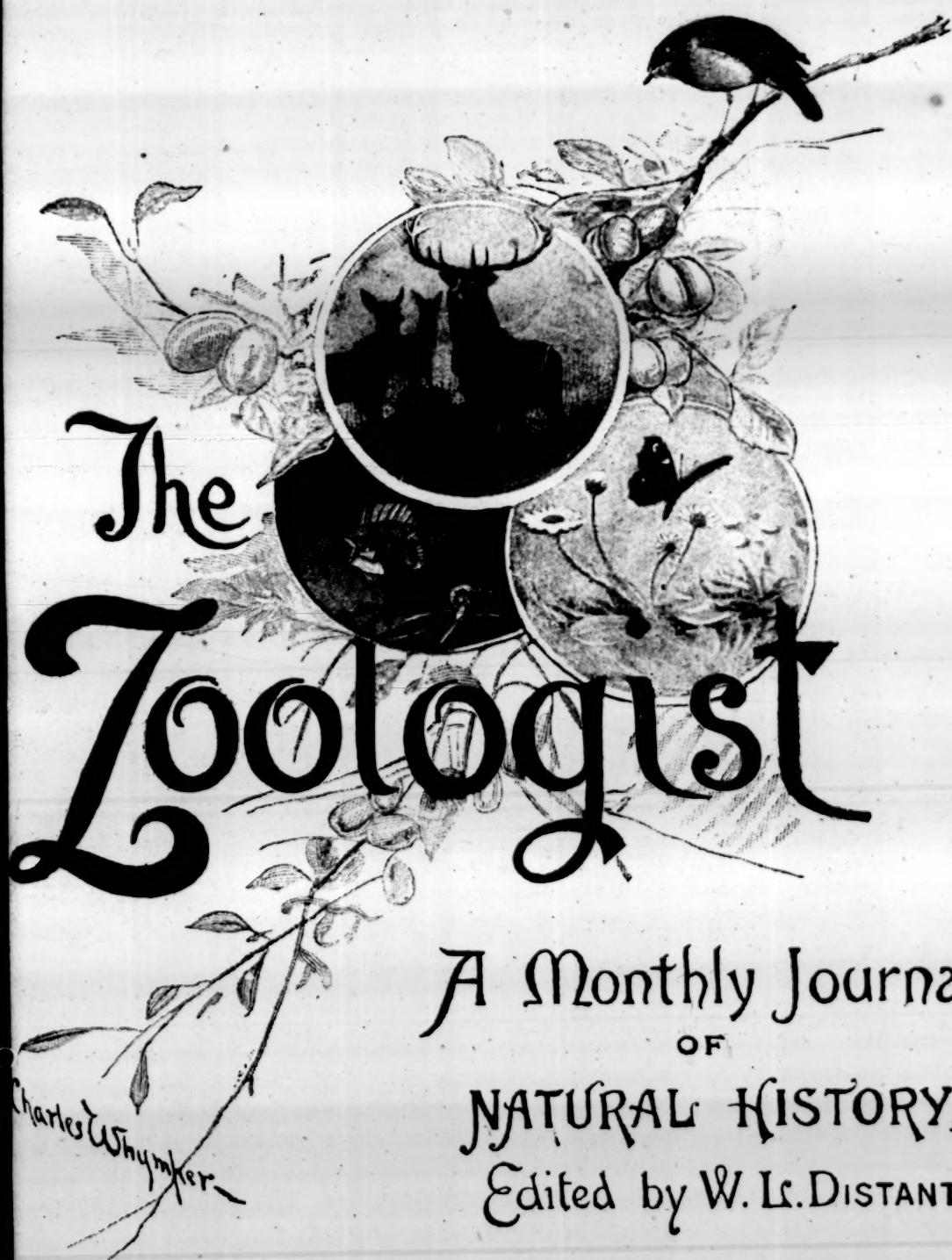
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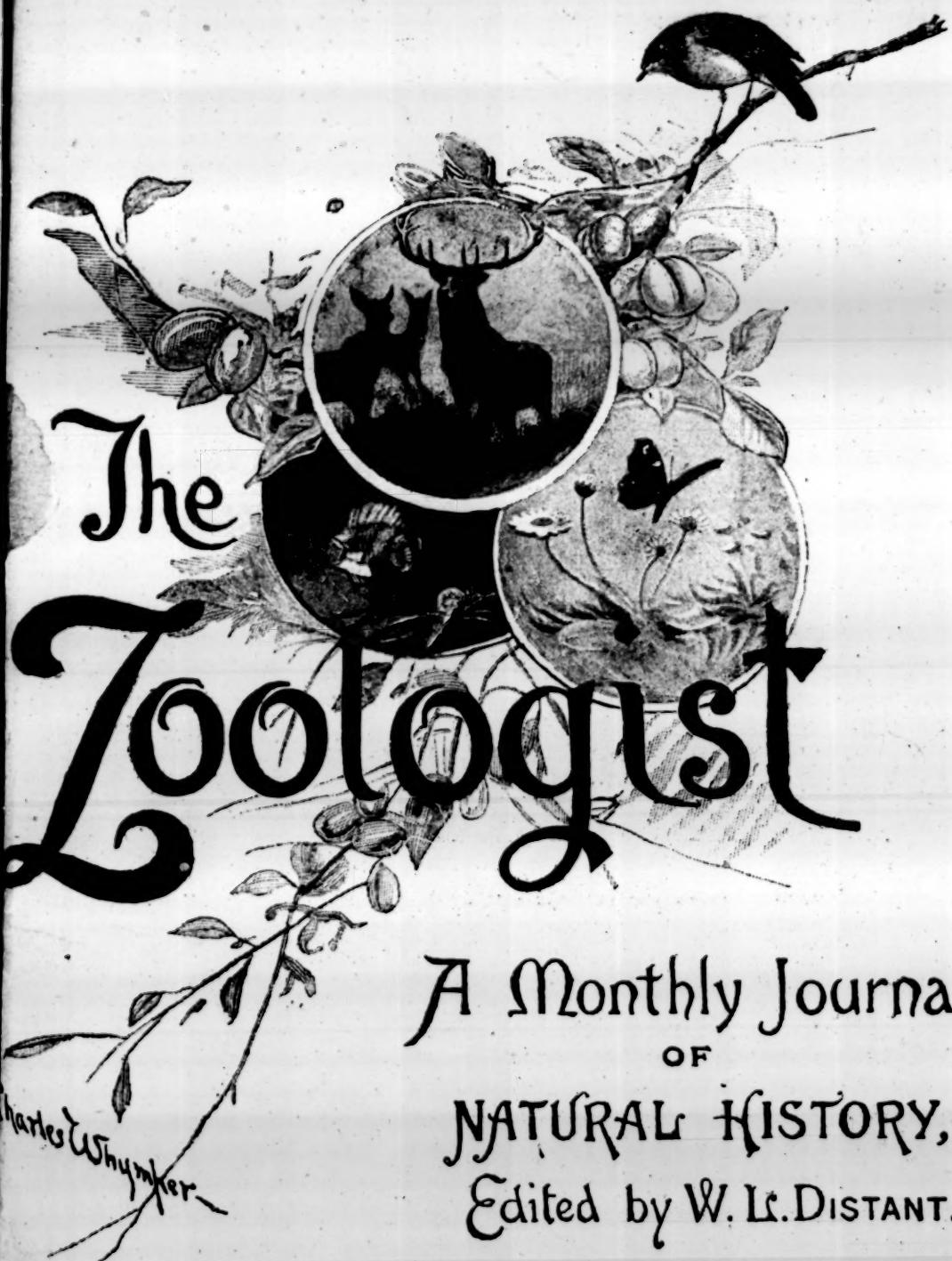
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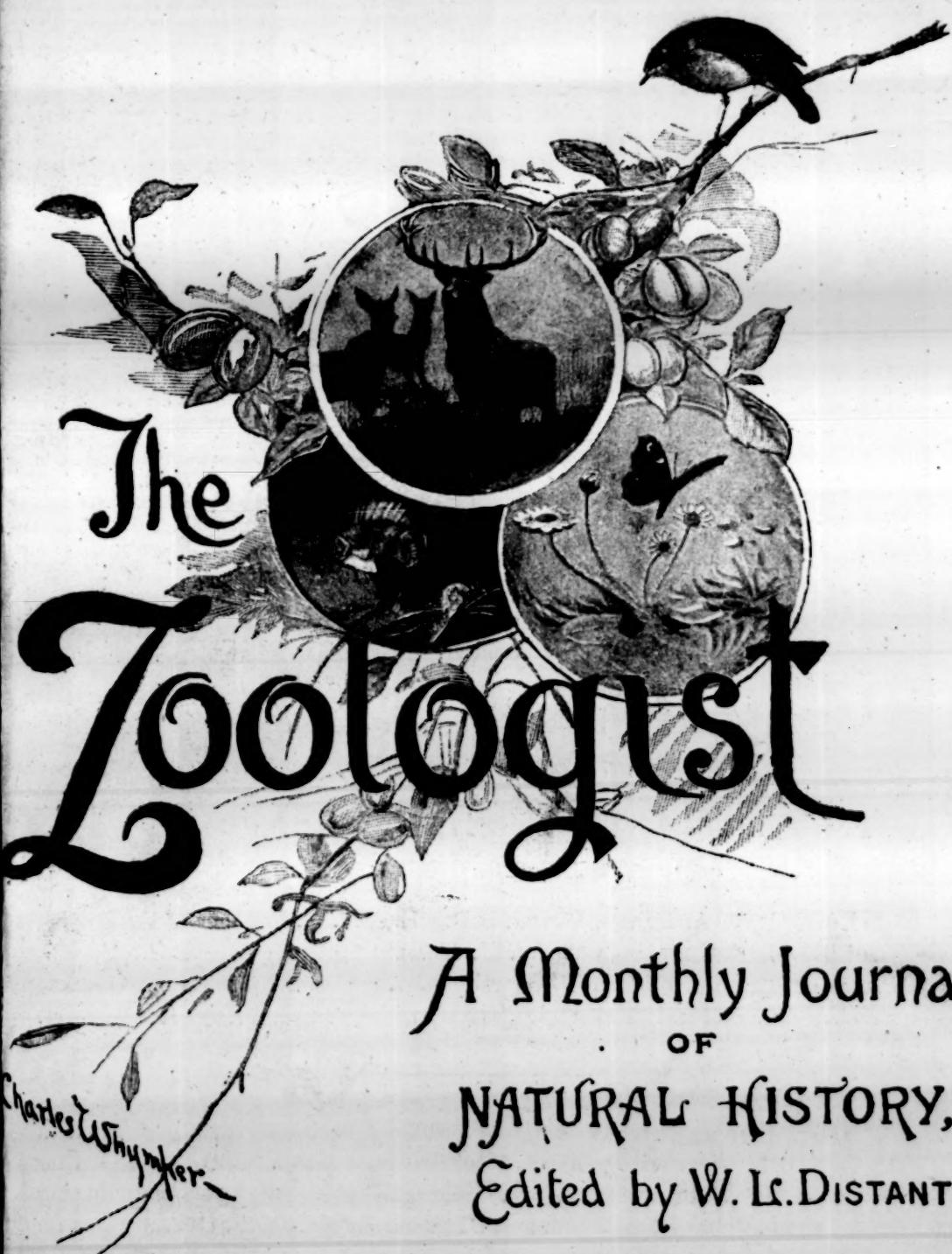
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